

# SINDH CURRICULUM FOR COMPUTER EDUCATION

GRADES VI-VIII  
2024

(Based on National Curriculum Standards)

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## Introduction

Computer science education in middle grades is crucial. Firstly, it instills digital literacy, an essential skill in today's technology-dominated landscape, enabling students to navigate digital tools effectively. Additionally, computer science cultivates problem-solving skills, encouraging students to dissect complex issues into manageable parts and develop logical solutions, which are valuable life skills. Introducing coding and programming concepts at this stage provides a foundational understanding of software and fosters creativity and innovation. Furthermore, as the job market increasingly demands technological proficiency, early exposure to computer science prepares students for future careers in STEM fields. Beyond technical skills, computer science encourages interdisciplinary connections, illustrating its relevance to subjects like mathematics, science, and the arts. It promotes logical thinking, global competence, and ethical use of technology, contributing to responsible digital citizenship. By embracing diversity and inclusion, computer science education ensures that students from various backgrounds can engage with technology, bridging the digital divide. In essence, computer science education in middle grades not only imparts practical skills but also nurtures a mindset of curiosity, problem-solving, and creativity that serves students well in their academic and professional journeys.

Several emerging fields in computer science are shaping the future of technology. Quantum computing stands out as a transformative area, leveraging principles of quantum mechanics to perform computations at speeds unimaginable with classical computers. Artificial Intelligence (AI) continues to evolve, with a focus on explainable AI, ethical AI, and advancements in natural language processing, enabling more human-like interactions. Edge computing is gaining prominence, distributing computation and storage closer to the data source to reduce latency and enhance real-time processing. Augmented Reality (AR) and Virtual Reality (VR) are burgeoning fields, offering immersive experiences and applications ranging from gaming to education and healthcare. Cybersecurity remains critical, with an emphasis on novel approaches such as homomorphic encryption and secure multi-party computation to protect data privacy. Blockchain technology is expanding beyond cryptocurrencies, finding applications in decentralized finance, supply chain management, and digital identity. The Internet of Things (IoT) continues to grow, connecting an increasing number of devices and generating vast amounts of data for analysis and decision-making. As technology advances, these emerging fields in computer science are poised to reshape industries and create new possibilities.

## **Use of Computers in Education**

The use of computers in education has become increasingly prevalent, revolutionizing traditional teaching methods and enhancing the learning experience for students. One primary application is in the realm of digital resources and online learning platforms. Computers enable access to a vast selection of educational materials, from e-books and online articles to interactive simulations and multimedia presentations, fostering a dynamic and engaging learning environment.

Moreover, computers facilitate personalized learning experiences through adaptive learning platforms and intelligent tutoring systems. These systems analyze individual student performance and tailor educational content to meet the specific needs and learning pace of each student, promoting a more effective and personalized learning journey.

Collaborative learning is another area where computers play a crucial role. Virtual classrooms and online collaboration tools enable students to work together on projects, share ideas, and engage in discussions regardless of physical location. This fosters a sense of community and encourages teamwork, skills essential for the collaborative nature of many professional environments.

Furthermore, computers serve as a platform for distance education and online courses, breaking down geographical barriers and providing access to educational resources for individuals who might not have traditional educational opportunities. This is particularly significant in higher education, where online programs allow working professionals to pursue advanced degrees while balancing their professional and personal responsibilities.

The integration of technology in the classroom also enhances teacher effectiveness. Educators can use computers to create multimedia-rich presentations, interactive lessons, and educational games that cater to diverse learning styles. Additionally, computer-based assessment tools streamline the evaluation process, providing immediate feedback to both teachers and students.

## **Rationale for the Review of Curriculum**

After 18<sup>th</sup> amendment in 2010, Sindh was the first province in Pakistan which started developing and reviewing the curriculum. In first phase, curriculum for primary grades was reviewed from 2014 to 2015. In this phase minor changes were made in the National Curriculum 2007. The Computer Education Grade VI- VIII 2007 curriculum was also reviewed during this period and notified with some changes. Based on this review, Sindh Textbook Board developed and printed

new textbooks.

On the other hand, National Curriculum Council was established in 2015 at federal level. This council also develop all curricula from ECCE to XII. Sindh showed its reservation about the adoption and implementation of the National Curriculum. Nevertheless, later it was decided that the National Curriculum Standards would be adopted for subjects like Computer Science, Physics, Chemistry and Biology. However, the organizations and content of detailed SLOs (Curriculum Guide) may be modified as per need. Based on this notion, the Directorate of Curriculum, Assessment and Research Sindh started reviewing the curricula to align curriculum with National Curriculum Standards.

This curriculum is based on National Curriculum of Computer Science 2019. However, certain improvement have been brought in this curriculum of Computer Education.

## Major Changes

Following major changes were made in the curriculum to adapt the National Curriculum for Computer Science for Grade VI to VIII.

- The Standards and SLOs were reviewed in the Progression Grid and minor changes have been made.
- The Progression Grid and Curriculum Guidelines are merged.
- In the light of allocated periods for Computer Education in Provincial Scheme of Studies, the curriculum has been lightened.
- The SLOs from Curriculum Guideline have been reviewed. As per need SLOs are shuffled, added, modified and deleted while a number of SLOs were clubbed together.
- The sections of Knowledge and Skills in the Curriculum Guide have been merged.
- All SLOs are categorized according to cognitive level.
- The suggested activities and assessments have been reduced in number and simplified as well.
- The domain wise weightage and period allocation have been added.
- Guidelines for authors, teachers and teacher educators have been added.

## Computer Science (6-8) Progression Grid

The Progression Grid template below is taken from the English Curriculum 2020<sup>1</sup>. There are two changes made. First, the template begins with the Domain name instead of Competency. Second, the columns are extended to Grade 12. Please note that some Standards and Student Learning Outcomes will not begin until a higher grade or learning level. This template format must be consistent for all subjects.

The Domains in this are:

- A. ICT Fundamentals
- B. Digital Skills
- C. Algorithmic Thinking and Problem Solving
- D. Programming
- E. Digital Citizenship
- F. Entrepreneurship in Digital Age

### Progression Grid

#### Domain A: ICT Fundamentals

**Standard:** Students develop an understanding of ICT, ICT devices, computer systems (hardware), and networks

Grade 6	Grade 7	Grade 8
<b>Benchmarks:</b> Students will be able to recognize computer systems and various ICT devices; differentiate between hardware and software; analyze the importance, advantages, and uses of ICT devices; analyze the use of emerging technologies in various walks of life; define a network, identify and analyze the core networking components and their roles		
<b>Student learning outcomes</b>		
[SLO: CS-06-A-01] Students will be able to recognize various ICT devices and their applications.		
	[SLO: CS-07-A-01] Students will be able to identify the use of emerging technologies in various walks of life (e.g. artificial	[SLO: CS-08-A-01] Students will be able to analyze the usage of emerging technologies in various walks of life (e.g. artificial

<sup>1</sup> <http://www.mofept.gov.pk/SiteImage/Misc/files/SNC%20English%201-5.pdf> (pg. 22)

	intelligence, biometrics, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, Cloud Computing, and open-source software.	intelligence, 5G, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, distributed applications, block-chain, and Machine Learning.)
[SLO: CS-06-A-02] Students will be able to define and differentiate between computer hardware and software.		
[SLO: CS-06-A-03] Students will be able to identify and analyze (basic) hardware components of a computing system (e.g. input, output, storage, and processing).	[SLO: CS-07-A-02] Students will be able to identify (advanced) hardware components of a computing system (e.g. different types of I/O ports, different types of peripherals).	
		[SLO: CS-08-A-02] Students will be able to identify and analyze a network and identify core networking components and their roles.

## Domain B: Digital Skills

**Standard:** Develop various digital skills about the usage of operating systems, image processing, word processing, presentation, data handling and internet

Grade 6	Grade 7	Grade 8
<b>Benchmarks:</b> Students will be able to navigate around an Operating System; efficiently use computer hardware; develop and demonstrate image processing, word processing, presentation, and data handling skills (using various software tools)		
<b>Student learning outcomes</b>		
[SLO: CS-06-B-01] Students will be able to navigate around an Operating System (e.g. Microsoft Windows, MAC OS, Linux, Ubuntu, Android, iOS, etc).		
[SLO: CS-06-B-02] Students will be able to develop and demonstrate image-processing skills (using various software tools e.g. Paint, 3D Paint, Tux, etc.), while efficiently using	[SLO: CS-07-B-01] Students will be able to develop and demonstrate word-processing and presentation skills (using various software tools e.g. MS Word, MS	[SLO: CS-08-B-01] Students will be able to develop and demonstrate data handling skills (using various software tools e.g. MS Excel, Google sheets, etc.)

computer hardware (e.g. mouse, keyboard, etc.)	PowerPoint, Prezi, Canva, Photo Story, Movie-maker, etc.)	
[SLO: CS-06-B-03] Students will demonstrate how to use the internet to conduct a search query and arrive at an authentic result.	[SLO: CS-07-B-02] Students will get introduced to electronic mailing systems (e-mail) and learn appropriate usage.	<i>[SLO: CS-08-B-Add] <b>Additional SLO</b> Students will learn how to research information from the internet for a report that answers a research question and communicates results and conclusions.</i>

### Domain C: Algorithmic Thinking and Problem Solving

**Standard:** Identify, define, and analyze a problem, and apply algorithmic thinking and problem-solving strategies to develop step-by-step solutions to solve problems

Grade 6	Grade 7	Grade 8
<b>Benchmarks:</b> Students will be able to identify, define and analyze a problem; apply the concepts of computational thinking and problem-solving strategies to solve complex problems; apply basic concepts and concept of nesting in algorithmic design thinking		
<b>Student learning outcomes</b>		
[SLO: CS-06-C-01] Students will be able to identify, define and analyze a problem; and develop a step-by-step solution to solve simple problems.	[SLO: CS-07-C-01] Students will be able to apply the concept of computational thinking to handle complex problems.	[SLO: CS-08-C-01] Students will be able to apply the concepts of computational thinking and problem-solving strategies to solve complex problems by identifying the most efficient algorithm
[SLO: CS-06-C-02] Students will be able to analyze and apply basic algorithmic thinking to solve different types of problems.	[SLO: CS-07-C-02] Students will be able to apply concepts of conditional statements, finite and infinite loops to write different algorithms.	[SLO: CS-08-C-02] Students will be able to apply the concepts of nesting in algorithmic design thinking.



## Domain D: Programming

**Standard:** Understand and apply fundamental programming constructs using programming tools.

Grade 6	Grade 7	Grade 8
<p><b>Benchmarks</b> Students will be able to recognize the fundamentals of computer programming; analyze how computers encode and decode information; apply fundamental programming constructs by creating various types of programs using visual programming tools.</p>		
<p><b>Student learning outcomes</b></p>		
<p>[SLO: CS-06-D-01] Students will be able to analyze the fundamentals of computer programming.</p>	<p>[SLO: CS-07-D-01] Students will be able to explain how computers encode and decode computer programs (i.e. identification of decimal to binary and vice versa, conversion of texts and images and in binary).</p>	
<p>[SLO: CS-06-D-02] Students will be able to analyze and apply basic programming constructs (e.g. sequence, selection, repetition, variables, inputs/events); by creating simple single-sprite, single-script programs using a visual programming tool.</p>	<p>[SLO: CS-07-D-02] Students will be able to apply fundamental programming concept to create multi-sprite, multi-script programs using visual programming tools.</p>	<p>[SLO: CS-08-D-01] Students will be able to apply intermediate-level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a visual programming tool.</p>

## Domain E: Digital Citizenship

**Standard:** Learn the basic ethics of the internet, use of safe internet, identify risks involved in an online exchange of information and apply digital safety protocols.

Grade 6	Grade 7	Grade 8
<p><b>Benchmarks:</b></p> <p>Students will be able to use the internet through various connections, search relevant and authentic content, write an email for different purposes and protect the device against viruses. Students will also be able to identify and apply ICT and internet ethics, mitigate health risks involved in using ICT devices, familiarize themselves with cyber issues, and realize risks involved in information exchange by taking necessary precautions against cyber issues.</p>		
<p><b>Student learning outcomes</b></p>		
<p>[SLO: CS-06-E-01] Students will be able to describe the basics of information literacy, digital civility and appropriate uses of technology.</p>	<p>[SLO: CS-07-E-01] Students will identify ways to protect against malicious activities or behaviors in the digital environment.</p>	<p>[SLO: CS-08-E-01] Students will identify ways of protecting against cybercrimes.</p>

## Domain F: Entrepreneurship in Digital Age

**Standard:** Students will understand and apply the tools and mindsets needed to develop and launch a business idea using technology.

Grade 6	Grade 7	Grade 8
<b>Benchmarks:</b> Students will apply the tools and mindsets needed to develop and launch a business idea.		
<b>Student learning outcomes</b>		
<u>[SLO: CS-06-F-01]</u> Students will define and analyze entrepreneurship subtypes and summarize the entrepreneurship process	<u>[SLO: CS-07-F-01]</u> Students will analyze the uses and benefits of design thinking for entrepreneurs.	<u>[SLO: CS-08-F-01]</u> Students will be able to identify and create different components of a business plan i.e. market need, product design, costing, operations, and marketing.
		<u>[SLO: CS-08-F-02]</u> Students will develop an understanding of the basics of digital marketing platforms and social media marketing to develop a marketing plan for a business.

## Grade VI

### DOMAIN A: ICT Fundamentals

<b>Standard:</b> Students develop an understanding of ICT, ICT devices, computer systems (hardware), and networks.		
<b>Student Learning Outcomes 1:</b> <i>Students will be able to recognize various ICT devices and their applications.</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>ICT Fundamental</li> </ul>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>Define                             <ul style="list-style-type: none"> <li>Computer</li> <li>ICT (Information and Communication Technology)</li> </ul> </li> <li>Summarize the different developments in the history of Computers.</li> </ul>	K
		U
<ul style="list-style-type: none"> <li>Uses of ICT</li> </ul>	<ul style="list-style-type: none"> <li>Identify various ICT devices</li> <li>Discuss the applications of the ICT devices in daily life</li> <li>Recognize a computer and its external components</li> <li>Apply their knowledge to operate computer devices (like mouse/ keyboard/ printer &amp; touch devices)</li> <li>Advantages &amp; disadvantages of ICT devices</li> <li>Identify the application of ICT in:                             <ul style="list-style-type: none"> <li>Communication</li> <li>Business</li> <li>Manufacturing</li> </ul> </li> </ul>	K
		U
		K
		A
		U
<b>Student Learning Outcomes 2:</b> <i>Students will be able to define and differentiate between computer hardware and software.</i>		
<ul style="list-style-type: none"> <li>Computer Hardware and Software</li> </ul>	<ul style="list-style-type: none"> <li>Define hardware and software</li> <li>Differentiate hardware and software with examples</li> </ul>	K
		U
<b>Student Learning Outcomes 3:</b> <i>Students will be able to identify and analyze (basic) hardware components of a computing system (e.g. input, output, storage, and processing).</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>Computer System</li> </ul>	<ul style="list-style-type: none"> <li>Identify Hardware components of a computer:                             <ul style="list-style-type: none"> <li><i>Input Devices</i> (e.g. keyboard, mouse, scanner, microphone, digital camera, sensors, etc.).</li> <li><i>Output Devices</i> (e.g. LCD/LED/SMD, printer, speakers, multimedia projector, etc.)</li> </ul> </li> <li>Recognize components of a computer (processor, memory, and storage as essential)</li> <li>Differentiate between data and information</li> <li>Identify various steps involved in processing data</li> </ul>	U
		K
		U
		U

	<ul style="list-style-type: none"> <li>Identify types of computer memory (RAM and ROM)</li> <li>Recognize the types of storage (SSD, HDD, USB Flash, Memory Cards etc.)</li> <li>Compare the advantages and disadvantages of various types of storage</li> </ul>	K U  U
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### **DOMAIN B: Digital Skills**

**Standard:** Develop various digital skills about the usage of operating systems, image processing, word processing, presentation, data handling and internet.

**Student Learning Outcome 1:** *Students will be able to explore and use Operating System (e.g. Microsoft Windows, MAC OS, Android, iOS, etc.).*

Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>OS Basics</li> </ul>	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> <li>Define the term operating system</li> <li>Identify the functions of an Operating System</li> <li>Discuss types of operating systems for computers and mobile phone</li> <li>Demonstrate the startup procedure of any available operating system</li> <li>Identify the desktop icons/tools (desktop, start button, start menu, taskbar, notification area, desktop icons) and explaining their functions</li> </ul>	K U U  A  K
<ul style="list-style-type: none"> <li>Basic Skills of OS</li> </ul>	<ul style="list-style-type: none"> <li>Practice how to create, name, rename and delete a new file, folder and create a shortcut.</li> <li>Practice how to cut, copy, and paste a file/ folder to another folder/location, drag and drop a file/ folder to another folder/ location.</li> </ul>	A  A

**Student Learning Outcomes 2:** *Students will be able to apply and demonstrate image-processing skills (using various software tools e.g. Paint, 3D Paint, Tux, etc.), while efficiently using mouse, keyboard, etc.)*

Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>Image Processing</li> </ul>	<ul style="list-style-type: none"> <li>Use image processing software (e.g. Paint, 3D Paint, Tux, etc.) for creating and editing images.</li> <li>Explore image processing applications and draw freehand drawing using different brush types.</li> <li>Draw an image using 2D shapes like lines, circles, polygons, etc, and change color, outline, and position as needed.</li> <li>Add text to a drawing.</li> <li>Save a file and open saved files in paint.</li> </ul>	A  A  A  A A

**Student Learning Outcomes 3:** Students will demonstrate how to use the internet to conduct a search

query and arrive at an authentic result.		
<ul style="list-style-type: none"> <li>Internet Basics</li> </ul>	<ul style="list-style-type: none"> <li>Define Web Browsers</li> <li>List popular web browsers</li> <li>List commonly performed activities using web browsers</li> <li>Describe search engines</li> <li>Name popular search engines</li> <li>Demonstrate searching skills to look for certain topics using search engine</li> </ul>	K K K U K A

### ***DOMAIN C: Algorithmic Thinking and Problem Solving***

<b>Standard:</b> Identity, define, and analyze a problem, and apply algorithmic thinking and problem-solving strategies to develop step-by-step solutions to solve problems.		
<b>Student Learning Outcome 1:</b> <i>Students will be able to identify, define and analyze a problem; and develop a step-by-step solution to solve simple problems.</i>		
<b>Theme</b>	<b>Detailed SLOs</b>	<b>Cognitive Level</b>
<ul style="list-style-type: none"> <li>Problem Solving</li> </ul>	<p><b><i>Students will be able to:</i></b></p> <ul style="list-style-type: none"> <li>Define and identify a simple problem</li> <li>Analyze different steps to break- down a problem.</li> <li>Differentiate between simple and complex problems.</li> <li>Identify:               <ul style="list-style-type: none"> <li>What is given – facts.</li> <li>Data needed to solve the problem – input.</li> <li>The output of the problem when given a certain input.</li> <li>Specific instructions vs. nonspecific instructions.</li> </ul> </li> </ul> <p><i>Example: If a recipe is given, determine ingredients; given a maze, a robot, and a set of instructions the robot can follow; determine how to perform tasks using the given instructions; determine the task completed using given a set of instructions, etc.</i></p> <ul style="list-style-type: none"> <li>Practice breaking a problem into sub- problems (<i>e.g. process of making fries, getting ready for school, etc.</i>).</li> <li>Design a set of step-by-step instructions to solve a problem (<i>e.g., giving directions using a specific set of words</i>) through logic and reasoning.</li> <li>Integrate solutions of sub-problems to solve the main problem.</li> </ul>	K U U U A A A
<b>Student Learning Outcome:2</b> <i>Students will be able to analyze and apply basic algorithmic thinking to solve different types of problems</i>		
<b>Theme</b>	<b>Detailed SLOs</b>	<b>Cognitive Level</b>
<ul style="list-style-type: none"> <li>Algorithmic Thinking</li> </ul>	<ul style="list-style-type: none"> <li>List benefits of algorithmic thinking.</li> <li>Recognize that algorithms are a sequence of precisely described instructions.</li> </ul>	K U

	<ul style="list-style-type: none"> <li>Define conditional statements/ selection statements that decide whether certain instructions should run (<i>e.g. if there is rain take an umbrella</i>)?</li> <li>Identify loops, and analyze how they allow instructions to be repeated.</li> <li>Analyze ways to solve a problem by using a combination of sequence, selection, and repetition.</li> </ul>	K U A
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### **DOMAIN D: Programming**

<b>Standard:</b> Understand and apply fundamental programming constructs using programming tools.		
<b>Student Learning Outcome 1:</b> <i>Students will be able to analyze the fundamentals of computer programming.</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>Programming Basics</li> </ul>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>Define a computer program</li> <li>Discuss the importance of programming language.</li> <li>List different uses of computer programming.</li> <li>Differentiate between an algorithm and a program.</li> </ul> <p><b>Recommendations</b>  <i>The contents shall contain complete illustration about Scratch operating. The class activities shall be comprised of scratch related tasks.</i></p>	K U K U
<b>Student Learning Outcome 2:</b> <i>Students will be able to analyze and apply basic programming constructs (e.g. sequence, selection, repetition, variables, inputs/events); by creating simple single- sprite, single-script programs using visual programming tools.</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>Programming Skills</li> </ul>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>List the fundamental programming concepts <ul style="list-style-type: none"> <li>Command or statement is an instruction for computer</li> <li>A variable is used to store information</li> <li>An event is an action from the user</li> <li>A sequence is a series of actions</li> <li>A loop repeats instructions</li> <li>A conditional statement is a selection</li> </ul> </li> <li>Explain the environment and tools in Scratch including sprite and scripts</li> <li>Build simple Scratch Program using <ul style="list-style-type: none"> <li>Sprite</li> <li>Event</li> <li>Motion</li> <li>Condition</li> <li>Loop</li> </ul> </li> <li>Run, save and open Scratch program</li> </ul>	U  A A  A

### DOMAIN E: Digital Citizenship

<b>Standard:</b> Learn the basic ethics of the internet, use of safe internet, identify risks involved in an online exchange of information and apply digital safety protocols.		
<b>Student Learning Outcomes 1:</b> <i>Students will be able to describe the basics of information literacy, digital civility and appropriate uses of technology.</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li><b>Ethical Use of Technology</b></li> </ul>	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> <li>Discuss essentials of good digital citizenship such as safe and responsible use of technology.</li> <li>Define copyright, plagiarism, and piracy</li> <li>Identify ethical issues that arise in ICT while surfing online.</li> </ul>	U K U
<ul style="list-style-type: none"> <li><b>Health and Taking Care</b></li> </ul>	<ul style="list-style-type: none"> <li>Describe health-related issues of using ICT devices.               <ul style="list-style-type: none"> <li>Proper posture</li> <li>Usage span</li> <li>Eye Strain and Fatigue</li> <li>Sleep disorder</li> </ul> </li> <li>List school ICT lab rules.</li> <li>Use devices with care and responsibility</li> </ul>	U  K A

### DOMAIN F: Entrepreneurship in Digital Age

<b>Standard:</b> Students will understand and apply the tools and mindsets needed to develop and launch a business idea using technology.		
<b>Student Learning Outcomes 1:</b> <i>Students will be able to define and analyze entrepreneurship, its subtypes, and the entrepreneurship process.</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li><b>Basics of Entrepreneurship</b></li> </ul>	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> <li>Define the term ‘Entrepreneurship’.</li> <li>Discuss different types of entrepreneurs and present a few examples of entrepreneurs.</li> <li>Differentiate between traditional &amp; digital entrepreneurship along with examples.</li> <li>Describe the entrepreneurship process.</li> <li>Identify the use of technology in entrepreneurship</li> </ul>	K U  U U U



## Grade VII

### DOMAIN A: ICT Fundamentals

**Standard:** Students develop an understanding of ICT, ICT devices, computer systems (hardware), and networks.

**Student Learning Outcomes 1:** *Students will be able to identify the use of emerging technologies in various walks of life (e.g. artificial intelligence, biometrics, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, Cloud Computing, and open-source software).*

Theme	Detailed SLOs	Cognitive Level
<b>Emerging Technology</b>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Describe the following emerging technologies:                             <ul style="list-style-type: none"> <li>○ Artificial intelligence</li> <li>○ Robotics</li> <li>○ Biometrics</li> <li>○ Computer Assisted Translation</li> <li>○ Virtual reality</li> <li>○ 3D and holographic imaging</li> <li>○ Cloud Computing</li> </ul> </li> </ul>	U
	<ul style="list-style-type: none"> <li>● Recognize the progression in various technologies (e.g. landline phones to smartphones, 1<sup>st</sup> generation computer processors to 12<sup>th</sup> generation computer processors, etc).</li> </ul>	U

**Student Learning Outcomes 2:** *Students will be able to identify (advanced) hardware components of a computing system (e.g. different types of I/O ports and different types of peripherals).*

Theme	Detailed SLOs	Cognitive Level
<b>● Components of Computer</b>	<ul style="list-style-type: none"> <li>● Identify different I/O ports of a computer system (USB port, Type-C port, HDMI port, SATA port, PCI-express port, etc.)</li> </ul>	U
	<ul style="list-style-type: none"> <li>● Describe the functions of different I/O Ports</li> </ul>	U
	<ul style="list-style-type: none"> <li>● Identify different peripherals of a computer system (e.g. graphic card, printers, scanners, mouse, keyboard, webcams, etc.)</li> </ul>	K
	<ul style="list-style-type: none"> <li>● Describe the applications of different peripherals.</li> </ul>	U

### DOMAIN B: Digital Skills

**Standard:** Develop various digital skills about the usage of operating systems, image processing, word processing, presentation, data handling and internet.

**Student Learning Outcome 1:** *Students will be able to develop and demonstrate word-processing and presentation skills (using various software tools e.g. MS Word, MS PowerPoint, Prezi, Canva, Photo Story, Movie-maker, etc.)*

Theme	Detailed SLOs	Cognitive Level
<b>Knowledge of</b>	<b>Students will be able to:</b>	

<b>Word Processor</b>	<ul style="list-style-type: none"> <li>● Describe the purpose of a word processor.</li> <li>● Create and edit a document using any word processing software (e.g. MS Word, Google Docs, notepad, Open Office, etc).</li> </ul>	K A
<b>Exploring Functions of Word Processor</b>	<ul style="list-style-type: none"> <li>● Create an artifact (report, essay, etc.) using the following tools in word processing software: <ul style="list-style-type: none"> <li>○ Open a new Word document and tinker with the user interface of the word processor (MS Word).</li> <li>○ Add and modify the text (underline, bold, italicize, font style, font size, font color) to a document in the word processor (MS Word).</li> <li>○ Save and open files in the word processor (MS Word).</li> <li>○ Format a document in the word processor (MS Word) (text alignment, bullets, page margins, page layout, spacing, indent).</li> <li>○ Insert, resize and add text in images in the document.</li> <li>○ Cut, copy, and paste text/image into a document.</li> <li>○ Use spell-check.</li> <li>○ Create and modify numbered and bulleted lists.</li> <li>○ Demonstrate understanding of the difference between Save and Save as.</li> <li>○ Insert and format a table.</li> <li>○ Add header, footer, and page numbers in a document.</li> <li>○ Use thesaurus and synonym features</li> <li>○ Apply a procedure to print a document</li> </ul> </li> </ul>	A
<b>Knowledge Presentation Software</b>	<ul style="list-style-type: none"> <li>● Explain the importance of a presentation tool.</li> <li>● Create a presentation using any one of the presentation software (MS Power Point, Google Slides, Prezi, etc).</li> </ul>	U A
<b>Exploring Functions of Presentation Software</b>	<ul style="list-style-type: none"> <li>● Create a multimedia presentation by: <ul style="list-style-type: none"> <li>○ Adding new slides.</li> <li>○ Adding various objects on the slides (image, text, video, audio, etc).</li> <li>○ Animating an object to appear on click.</li> <li>○ Creating internal/external Hyperlinks.</li> <li>○ Adding notes.</li> </ul> </li> <li>● Creating a slideshow and an executable file.</li> </ul>	A A
<b>Student Learning Outcome 2:</b> <i>Students will get introduced to electronic mailing systems (e-mail) and learn appropriate usage.</i>		
<b>Theme</b>	<b>Detailed SLOs</b>	<b>Cognitive Level</b>

<ul style="list-style-type: none"> <li>• <b>Basics of Email</b></li> </ul>	<ul style="list-style-type: none"> <li>• List the uses of electronic mail (e-mail).</li> <li>• Identify and explain the common platforms for electronic mail.</li> <li>• Define the following terms <ul style="list-style-type: none"> <li>• email address</li> <li>• password</li> <li>• contacts</li> </ul> </li> <li>• Create an e-mail address, and how to send electronic mail (tone, language, etc).</li> </ul>	<ul style="list-style-type: none"> <li>K</li> <li>U</li> <li>K</li> <li>A</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Using e-mail</b></li> </ul>	<ul style="list-style-type: none"> <li>• Use an email service to create an email account.</li> <li>• Compose an e-mail with the appropriate subject line, content, and signature, adding in appropriate addressee, cc, bcc, and attachments</li> <li>• Organize emails using different folders/labels.</li> <li>• Demonstrate the use of signing in and out process appropriately</li> <li>• Demonstrate the process of authentication. <i>Note: Authentication through email or phone number</i></li> </ul>	<ul style="list-style-type: none"> <li>A</li> <li>A</li> <li>A</li> <li>A</li> <li>A</li> </ul>

**DOMAIN C: Algorithmic Thinking and Problem Solving**

<b>Standard:</b> Identify, define, and analyze a problem, and apply algorithmic thinking and problem-solving strategies to develop step-by-step solutions to solve problems.		
<b>Student Learning Outcome 1:</b> <i>Students will be able to apply the concept of computational thinking to handle complex problems.</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>• <b>Developing Algorithms</b></li> </ul>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• Explain that an algorithm is a sequence of precisely described instructions.</li> <li>• Describe how to apply computational thinking to solve a complex problem (breaking down a problem, identifying important information, logical thinking, and confidence in decision making).</li> <li>• Extract relevant information required to solve the problem (abstraction).</li> <li>• Break down a problem by identifying patterns/similarities to solve a complex problem.</li> <li>• Write and design algorithms for complex problems.</li> <li>• Draw a flowchart (input, output, process, and decisions) to graphically represent an algorithm.</li> </ul>	<ul style="list-style-type: none"> <li>U</li> <li>A</li> <li>U</li> <li>A</li> <li>A</li> <li>A</li> <li>A</li> </ul>
<b>Student Learning Outcome 2:</b> <i>Students will be able to apply concepts of conditional statements, finite, and infinite loops to write different algorithms.</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>• <b>Conditional Statements</b></li> </ul>	<ul style="list-style-type: none"> <li>• Determine where to use a finite loop and infinite loop.</li> <li>• Determine where to use conditional statements.</li> </ul>	<ul style="list-style-type: none"> <li>A</li> <li>A</li> </ul>

<b>and Loops</b>	<ul style="list-style-type: none"> <li>• Infer clear instructions to be considered for an algorithm to produce correct results.</li> </ul>	A
	<ul style="list-style-type: none"> <li>• Recognize that more than one algorithm can solve a given problem.</li> </ul>	U
	<ul style="list-style-type: none"> <li>• Apply finite and infinite loops in algorithm building using conditional statement (If and If Else).</li> </ul>	A
	<ul style="list-style-type: none"> <li>• Break down a problem and create a sub- solution for each of its parts.</li> </ul>	A
	<ul style="list-style-type: none"> <li>• Practice the correct and in-correct statement / data to determine their output.</li> </ul>	A

### ***DOMAIN D: Programming***

<b>Standard:</b> Understand and apply fundamental programming constructs using programming tools.		
<b>Student Learning Outcome 1:</b> <i>Students will be able to understand how computers encode and decode computer programs (i.e. conversion of decimal to binary and vice versa, conversion of texts and images)</i>		
<b>Theme</b>	<b>Detailed SLOs</b>	<b>Cognitive Level</b>
<ul style="list-style-type: none"> <li>• <b>Number Conversion</b></li> </ul>	<i>Students will be able to:</i> <ul style="list-style-type: none"> <li>• Describe that computers store information using binary codes.</li> <li>• Differentiate between binary and decimal number systems.</li> <li>• Convert binary numbers into decimal numbers vice versa</li> </ul>	U U A
<ul style="list-style-type: none"> <li>• <b>Encoding Systems</b></li> </ul>	<ul style="list-style-type: none"> <li>• Explain that computer can only understand specific instructions.</li> <li>• Encode and decode text in binary using ASCII</li> <li>• Encode and decode images in binary using RGB and other format.</li> </ul>	U A A
<b>Student Learning Outcome 2:</b> <i>Students will be able to apply fundamental programming concepts to create multi-sprite, multi-script programs using visual programming tools.</i>		

<ul style="list-style-type: none"> <li>• <b>Writing Program Using Basic Features</b></li> </ul>	<ul style="list-style-type: none"> <li>• Articulate that a combination of programming concepts can be put together to create more complex projects. <ul style="list-style-type: none"> <li>○ The concept of combining <u>events &amp; coordinates</u> to allow a user to move or turn a sprite automatically (Using Scratch).</li> <li>○ The concept of setting a <u>condition using mathematical operators on a variable</u> (e.g. if the score is greater than 10, or if the timer is less than 0), or setting a condition for when two sprites collide (e.g. if touching another sprite).</li> <li>○ The concept of creating, setting, and changing a <u>variable under certain conditions</u> to either increase value (e.g. increase the score when the player touches a sprite) or decrease in value (e.g. countdown timer).</li> </ul> </li> <li>• Write a program that will (<i>Group Project</i>) <ul style="list-style-type: none"> <li>○ Allow the user to move a sprite using arrow keys.</li> <li>○ Make sprites move automatically without user intervention when the program starts.</li> <li>○ Award the player a score point under certain conditions, such as if they can touch another sprite that is automatically moving, or if the player clicks on a moving sprite.</li> </ul> </li> <li>• Create a countdown timer.</li> </ul>	<p>U</p> <p>A</p> <p>A</p>
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**DOMAIN E: Digital Citizenship**

<p><b>Standard 1: Standard:</b> Learn the basic ethics of the internet, use of safe internet, identify risks involved in an online exchange of information and apply digital safety protocols.</p>		
<p><b>Student Learning Outcomes 1:</b> <i>Students will identify ways to protect against <b>malicious activities</b> or behaviors in the digital environment.</i></p>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>• <b>Digital Ethics, Safety and Security</b></li> </ul>	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> <li>• Identify appropriate and inappropriate behavior while using the digital environment.</li> <li>• Describe Cyber Bullying</li> <li>• Describe the importance of netiquettes, being safe, responsible, and respectful while being online.</li> <li>• Discuss the issues of biasness on digital platform.</li> <li>• List improper use of computer resources.</li> <li>• Describe threats and actively protect devices and networks from viruses, intrusion, vandalism, and other malicious activities.</li> <li>• Discuss positive and negative impacts of using social media, both online and offline.</li> </ul>	<p>U</p> <p>U</p> <p>U</p> <p>U</p> <p>K</p> <p>U</p> <p>U</p>

## **DOMAIN F: Entrepreneurship in the Digital Age**

<b>Standard:</b> Students will understand and apply the tools and mindsets needed to develop and launch a business idea using technology.		
<i>Student Learning Outcomes 1: Students will be able to analyze the uses and benefits of design thinking for entrepreneurs.</i>		
<b>Theme</b>	<b>Detailed SLOs</b>	<b>Cognitive Level</b>
<b>• Design Thinking</b>	<i>Students will be able to:</i> <ul style="list-style-type: none"> <li>● Describe how innovation has changed the entrepreneurial mindset.</li> <li>● List the steps of the design thinking process include identifying an issue, empathizing, defining, ideate, prototyping, testing, reflecting, iterate/repeating as needed, and implementing.</li> <li>● Discuss the benefits to the innovation process of each design thinking step.</li> <li>● Explain a project through the design thinking process; identify an issue, prototype &amp; test.</li> <li>● Identify the use and benefits of design thinking for entrepreneurs.</li> </ul>	U
		K
		U
		A
		U
<b>• Global Issues</b>	<ul style="list-style-type: none"> <li>● Understand sustainable development goals in the context of the problems the world is facing that need to be solved.</li> <li>● Share examples of problems faced that could be solved by a product or a service.</li> </ul>	U
		U

## Grade VIII

### *DOMAIN A: ICT Fundamentals*

<b>Standard:</b> Students develop an understanding of ICT, ICT devices, computer systems (hardware), and networks		
<b>Student Learning Outcome 1:</b> <i>Students will be able to analyze the use of emerging technologies in various walks of life (e.g. artificial intelligence, 5G, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, distributed applications, block-chain, and Machine Learning)</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li>● <b>Impact of Emerging Technologies</b></li> </ul>	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> <li>● Explain the applications of emerging technologies in various walks of life (e.g. artificial intelligence, 5G, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, distributed applications, block-chain and Machine Learning etc.).</li> <li>● Analyze the impact of emerging technologies relevant to different fields. (e.g. artificial intelligence, 5G, robotics, computer- assisted translation, 3D and holographic imaging, virtual reality, distributed applications / block-chain, and machine learning).</li> </ul>	<p>U</p> <p>U</p>
	<b>Student Learning Outcome 2:</b> <i>Students will be able to analyze a network and identify core networking components and their roles.</i>	
<ul style="list-style-type: none"> <li>● <b>Network Components</b></li> </ul>	<ul style="list-style-type: none"> <li>● Identify basic terms of networks and networking</li> <li>● Describe hardware networking components with reference to their use.                             <ul style="list-style-type: none"> <li>○ NIC</li> <li>○ Routers</li> <li>○ Switches</li> <li>○ Hubs</li> <li>○ Modems</li> <li>○ Access Points</li> </ul> </li> <li>● Describe software networking components with reference to their use.                             <ul style="list-style-type: none"> <li>○ Network Protocols</li> <li>○ Network Operating System (NOS)</li> <li>○ Network Management Software:</li> </ul> </li> <li>● Recognize the Network Security issues</li> <li>● Describe the firewall and its application</li> <li>● Identify the emerging Technologies in networks                             <ul style="list-style-type: none"> <li>○ 5G networks</li> <li>○ Internet of Things (IoT)</li> <li>○ Edge computing</li> </ul> </li> </ul>	<p>U</p> <p>U</p> <p>U</p> <p>K</p> <p>U</p> <p>K</p>

### *DOMAIN B: Digital Skills*

<b>Standard:</b> Develop various digital skills about the usage of operating systems, image processing, word
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processing, presentation, data handling and internet		
<b>Student Learning Outcomes 1:</b> <i>Students will be able to develop and demonstrate data handling skills (using various software tools e.g. MS Excel, Google sheets, etc.)</i>		
Theme	Detailed SLOs	Cognitive Level
<b>Basics of Worksheets</b>	<i>Students will be able to:</i> <ul style="list-style-type: none"> <li>Describe the purpose and uses of spreadsheet software.</li> <li>List different spreadsheet software e.g. Excel, Google Sheets, OpenOffice</li> <li>Use spreadsheet interface to create a result card, home budget, timetable, etc</li> </ul>	K K A
<b>Preparing Worksheet</b>	<ul style="list-style-type: none"> <li>Create a spreadsheet (i.e. result card, home budget, timetable, etc.) using the following tools:</li> <li>Organize data in worksheets within a workbook.</li> <li>Select a range of cells.</li> <li>Add borders.</li> <li>Increase/Decrease column width and height.</li> <li>Use simple built-in functions (e.g. sum, average, minimum, maximum).</li> <li>Create simple formulae (arithmetic operations).</li> <li>Create an appropriate chart for data presentation.</li> </ul>	A A A A A A A

### **DOMAIN C: Algorithmic Thinking**

<b>Standard:</b> Identify, define and analyze a problem, and apply algorithmic thinking and problem-solving strategies to develop step-by-step solutions to solve problems.		
<b>Student Learning Outcomes 1:</b> <i>Students will be able to apply the concepts of computational thinking and problem-solving strategies to solve complex problems by identifying the most efficient algorithm</i>		
Theme	Detailed SLOs	Cognitive Level
<ul style="list-style-type: none"> <li><b>Simple and complex algorithms</b></li> </ul>	<i>Students will be able to:</i> <ul style="list-style-type: none"> <li>Define and infer simple and complex problems, and how to identify each.</li> <li>Create algorithms/ solutions to simple and complex problems.</li> <li>Discuss the scope and limitations of complex algorithms.</li> <li>Discuss basics of writing pseudo code</li> <li>Compare the performance of two algorithms.</li> <li>Apply the best possible solution to a problem from a pool of solutions.</li> <li>Explain, with examples, some problems, which cannot be solved computationally.</li> </ul>	U A U U A U
<b>Student Learning Outcomes 2:</b> <i>Students will be able to apply the concepts of nesting in algorithmic design thinking.</i>		



<ul style="list-style-type: none"> <li>● <b>Control Structure with Nesting</b></li> </ul>	<ul style="list-style-type: none"> <li>● Discuss the concept of constants and variables.</li> </ul>	U
	<ul style="list-style-type: none"> <li>● Discuss the concept of nesting.</li> </ul>	U
	<ul style="list-style-type: none"> <li>● Distinguish situations/ problem where If, If then else, and If with multiple conditions can be applied.</li> </ul>	U
	<ul style="list-style-type: none"> <li>● Apply the concept of nesting up to level 2 in looping and conditions.</li> </ul>	A
	<ul style="list-style-type: none"> <li>● Apply <i>repeat</i> and <i>forever</i> loops in Algorithm building.</li> <li>● Identify problem-solving techniques (sequence, loop, and conditions) applicable to a specific problem.</li> </ul>	A U

### **DOMAIN D: Programming**

<b>Standard:</b> Understand and apply fundamental programming constructs using programming tools.		
<b>Student Learning Outcome 1:</b> <i>Students will be able to apply intermediate-level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a visual programming tool.</i>		
<b>Sequence Loops, and Conditions</b>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Describe general control structure and their uses (sequence loops, and conditions)</li> <li>● Apply simple as well as nested loops in computer programs.</li> <li>● Differentiate between ‘<i>repeat</i>’, ‘<i>forever</i>’, and ‘<i>repeat until</i>’ loops.</li> <li>● Apply simple as well as nested conditions in computer programs.</li> <li>● Differentiate between if and if else conditions.</li> </ul>	U A U A U
<b>Functions &amp; Cloning</b>	<ul style="list-style-type: none"> <li>● Discuss the concept of functions in a computer program.</li> <li>● Use simple functions in a computer program.</li> <li>● Discuss the concept of cloning in a computer program.</li> <li>● Use cloning blocks in a computer program.</li> <li>● Design high-level games like tic-tac-toe, maze with multiple levels, etc (<b>Group Project</b>)</li> </ul>	U A U A A

### **DOMAIN E: Digital Citizenship**

<b>Standard:</b> Learn the basics of the internet, write an email, identify risks involved in an online exchange of information and apply digital safety protocols.		
<b>Student Learning Outcomes 1:</b> <i>Students will identify ways of protecting against cybercrimes.</i>		
<b>Theme</b>	<b>Detailed SLOs</b>	<b>Cognitive Level</b>
<b>Understanding and Combating Cyber Crimes</b>	<p><b>Students will be able to</b></p> <ul style="list-style-type: none"> <li>● Identify steps to secure information privacy and confidentiality.</li> </ul>	U
	<ul style="list-style-type: none"> <li>● Discuss cyber- crimes and its different forms.</li> </ul>	U
	<ul style="list-style-type: none"> <li>● Describe possible dangers of the internet and related security.</li> </ul>	U
	<ul style="list-style-type: none"> <li>● Discuss copyright, plagiarism, and piracy in detail.</li> </ul>	U

	<ul style="list-style-type: none"> <li>Identify the common uses of the internet such as business, social networking, entertainment, and information/news.</li> <li>Describe the ways of combating against cyber crime</li> <li>Inquire about the support system to respond against cyber crime</li> </ul>	<p>K</p> <p>U</p> <p>U</p>
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**DOMAIN F: Entrepreneurship in Digital Age**

<b>Standard:</b> Students will understand and apply the tools and mindsets needed to develop and launch a business idea using technology.		
<i>Student Learning Outcomes 1: Students will be able to identify and create different components of a business plan i.e. market need, product design, costing, operations, and marketing.</i>		
Theme	Detailed SLOs	Cognitive Level
<b>Business Plan</b>	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> <li>Define Business Plan and its components.</li> <li>Describe the basics of the components of a business plan, i.e. market need, product design, costing, operations, and marketing.</li> <li>Understand the difference between payment and transactions; choose safe transaction methods.</li> </ul>	<p>K</p> <p>U</p> <p>U</p>
<i>Student Learning Outcomes 2: Students will develop an understanding of the basics of digital marketing platforms and social media marketing to develop a marketing plan for a business.</i>		
<b>Digital Marketing</b>	<ul style="list-style-type: none"> <li>Discuss Search Engine Optimization (SEO), using social media websites such as Instagram, Twitter, and blogs.</li> <li>Apply the tools and techniques used for digital marketing.</li> <li>Design and develop a digital marketing plan and its component.</li> <li>Discuss the importance of project management and media literacy as a tool for a business plan.</li> </ul>	<p>U</p> <p>A</p> <p>A</p> <p>U</p>

## Suggested Activates Grade VI

<p>Domain A ICT Fundamentals</p>	<p><b>Activity 1.</b> Creating / Designing posters of Different Hardware of Computer / Laptop for presentations.</p> <p>Activity 2: Save and organize digital files on a USB drive or memory card. Create folders for different subjects and regularly back up important school work.</p> <p>Activity 3: Assign students to teams, with each team presenting arguments supporting either hardware or software as more crucial.</p> <p>Activity 4: Search and identify hardware components in a computer lab.</p>
<p>Domain B Digital Skills</p>	<p><b>Activity 1: Identify and locate common desktop elements.</b> Instruct students to explore the desktop of the operating system, locating and identifying each element. Students may take screenshots of draw pictures of desktop to discuss the purpose of each elements of desktop screen.</p> <p><b>Activity 2: Basic Image Editing with Paint</b> Ask students to draw simple image in Paint or 3D Paint by using basic tools such as; brush, fill, eraser to modify and enlarge the image. Guide them how to resizing, cropping and adding different shapes. Encourage students to showcasing their work of before and after.</p> <p><b>Activity 3</b>  Combine multiple pictures and collage in 3D Paint or Tux.</p> <p><b>Activity 4</b> Introduce popular search engines like Google, Yahoo, and Encyclopedia and discuss the purpose of search engines and how it help in finding information. Demonstrate the different ways of getting content or required knowledge by using search bar.</p>
<p>Domain C Algorithmic Thinking and Problem Solving</p>	<p><b>Activity 1:</b> Scenario local community facing challenges, For example; waste management.</p> <ul style="list-style-type: none"> <li>• Begin the class by discussing the importance of problem-solving skills in everyday life and various professions.</li> </ul>

	<ul style="list-style-type: none"> <li>• Emphasize that effective problem-solving starts with the ability to identify, define, and analyze the core aspects of a problem.</li> <li>• Provide background information on the current issues, such as overflowing bins, inefficient disposal methods, and environmental concerns.</li> </ul> <p>Activity 2: Understand the importance of sorting waste for recycling Present students with pictures or example of different types of waste, ask students to create an algorithm to sort the waste into proper way of recyclable. Provide index or flash cards for each waste category to students and ask them to discuss the significance of proper waste sorting for recycling efforts and its impact on atmosphere and climate changes.</p>
Domain D Programming	<p><b>Scratch Programming:</b></p> <ul style="list-style-type: none"> <li>• Transition from visual to textual programming by introducing Scratch or a similar block-based language.</li> <li>• Teach basic coding concepts such as variables and loops.</li> </ul>
Domain E Digital Citizenship	<p><b>Activity 1: Proper usage of Computer:</b></p> <ul style="list-style-type: none"> <li>• Create an environment for the students and ask them to perform role play and show how to start and shut down computer with proper siting way.</li> </ul>
Domain F Entrepreneurship in Digital Age	<p><b>Activity: 1: Classroom Business Project:</b></p> <ul style="list-style-type: none"> <li>• Divide the class into teams and assign each team a small business project. This could involve creating a product or service, developing a business plan, and presenting their ideas to the class.</li> </ul>

## Grade VII

<p>Domain A ICT Fundamentals</p>	<p><b>Activity 1: Technology Searcher:</b> Provide students with a list of emerging technologies (e.g., a smartphone, a computer, a smartwatch). In small groups, ask them to explore their homes or the school environment to find examples of these technologies.</p> <p><b>Activity 2: Paper Prototypes:</b> Instruct students to create paper prototypes of an emerging technology of their choice (e.g., a robot, a holographic image viewer).</p> <p><b>Activity 4: Virtual Hardware Exploration:</b> Utilize online interactive simulations or virtual labs that allow students to explore different hardware components virtually. Platforms like <i>online hardware simulators or 3D models</i> can provide a dynamic and engaging experience without the need for physical equipment elements.</p>
<p>Domain B Digital Skills</p>	<p><b>Activity 1: Documentary Film Project:</b> Divide students into groups and assign each group a historical event, scientific concept, or literary theme. Ask them to research, write a script using MS Word, and then use Movie Maker or other video editing tools to create a documentary.</p> <p><b>Activity 2: Create Your Email</b> Guide students through the process of creating a sample email address using a popular email service. Discuss the importance of choosing a professional username and password.</p> <p><b>Activity 3: Practice Session - Sending Emails:</b> Divide students into groups/pairs send practice emails to their classmates or a designated email address. Instruct them to include a subject line, proper content, and signature. Encourage them to explore the "To," "Cc," and "Bcc" fields and attach a file.</p>
<p>Domain C Algorithmic Thinking and Problem Solving</p>	<p><b>Activity 1: Algorithmic Riddles/Puzzle:</b> Provide a set of algorithmic riddles that require the application of finite and infinite loops. Challenge students to find creative ways to solve these riddles using different loop structures.</p> <p><b>Activity 2: Draw a flowchart to graphically represent an algorithm.</b> Instruct students to take the algorithm they created in the previous activity and translate it into a flowchart. Emphasize the use of standard flowchart symbols for input, output, process, and decisions.</p> <p><b>Activity 3: IF-Then-Else Scenarios :</b> Present a series of scenarios and problems where IF-Then-Else conditions</p>

	<p>can be applied. Students can work individually or in pairs to identify the conditions and outcomes for each scenario.</p>
<p>Domain D Programming</p>	<p><b>Activity 1: Image Representation</b>  Show a small image and discuss how it is represented in binary, introducing the concept of pixels and color representation.  Discuss common image formats and their binary representations.  If possible, demonstrate a simple pixel art activity on a computer or tablet to reinforce the concept.</p> <p><b>Activity 2: Math Challenge App</b>  Students need to design a math challenge app that generates random math problems, evaluates user input, and provides instant feedback.</p> <p><b>Activity 3: Interactive Storytelling</b>  Instruct students to creating interactive stories with multiple characters after choose a story theme and create sprites for different characters also use multiple scripts to control the characters' movements, expressions, and dialogues.</p>
<p>Domain E Digital Citizenship</p>	<p><b>Activity 1: Digital Behaviors Role-Playing</b>  Assign scenarios into groups to depicting various digital situations, including online discussions, gaming, or social media interactions.  Have students role-play both appropriate and inappropriate behaviors in these scenarios and importance of online etiquette.</p> <p><b>Activity 2: Internet Uses Research Project:</b>  Assign groups to research and present on one specific use of the internet (business, social networking, entertainment, information/news). Each group should highlight examples and discuss the impact on individuals and society.</p> <p><b>Activity 4: Online Safety Poster/Chart</b>  Instruct students to create a poster highlighting safe and responsible practices when using the internet.  Provide art supplies and encourage students to include visuals, catchy slogans, and practical tips in their posters for gallery walk</p>
<p>Domain F Entrepreneurship in Digital Age</p>	<p><b>Activity 1: Entrepreneurial Mindset Reflection</b>  Divide the class into small groups.  Assign each group a specific innovation that has had a significant impact on entrepreneurship (e.g., the internet, smartphones, social media), innovation changed the entrepreneurial mindset.</p> <p><b>Activity 2: Design Thinking Process Flowchart Objective:</b>  To familiarize students with the steps of the design thinking process, Instruct students to fill in the flowchart with the steps of the design thinking process,</p>

	<p>including identifying an issue, empathizing, defining, ideating, prototyping, testing, reflecting, iterating, and implementing.</p> <p><b>Activity 3: Sustainable Development Goals Exhibition</b>          Instruct students to work individually or in small groups to create exhibits that represent one or more sustainable development goals and their innovative solutions.          Or Encourage students to use various mediums such as visual displays, models, interactive activities, or multimedia presentations.          Or Organize an exhibition where students can showcase their exhibits to the school community, parents, or other grades.</p>
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## Grade VIII

<p>Domain A ICT Fundamentals</p>	<p><b>Activity 1</b>          Give students common devices that are used in real life. Ask them about the use of those devices. Show most common devices i.e.laptop, smartphones, and smart watches, Gaming Consoles, tablet, etc.</p> <p><b>Activity 2</b>          Organize a class debate on the different branches if AI technologies.i.e machine learning , human language translator</p> <p><b>Activity 3</b>          Show students network arrangements including internet. Make a dicussion on different network devices. Also differentiate between different networks and work of different network devices.</p>
<p>Domain B Digital Skills</p>	<p><b>Activity 1</b>          Ask students to make a worksheet using any spreadsheet tool i.e. MS Excel, Google sheets, etc). Give small project i.e.ike making salary, marksheet, budget of house or shop.</p> <p><b>Activity 2</b>          Arrange a competition to make different cell formulas, and make different types of charts from data from data in activity 1.</p>
<p>Domain C Algorithmic Thinking and Problem Solving</p>	<p><b>Activity 1</b>          Divide students in groups and give assignment to students that come with their own algorithms for specific tasks i.e organizing items in a certain order, find the largest number in a list, solving a maze, or generating a unique sequence of numbers.          Compare different solutions and select the best possible solution to a problem and give reasons to select it.</p> <p><b>Activity 2</b>          Ask students to make algorithms that identify problems using the IF statement with multiple conditions. (Nesting) i.e.select a dress according to weather.</p>

	<p><b>Activity 3</b> Give algorithms that use problem-solving techniques including loops. Also use nesting in them. Make a box of stars, counting daily sale of a shop or item in a month or given time.</p>
Domain D Programming	<p><b>Activity 1. (loop)</b> A program that makes many sprites in a given number with different patterns by using loop Also use nested loops. i.e. 10 sprites horizontally, vertically, in pyramid, etc.</p> <p><b>Activity 2. (loop compasion)</b> Divide student in three groups and ask each group to use three different loops to make same program. Then see which code is efficient. Groups share their programs.</p> <p><b>Activity 3. (if-else)</b> Write a program that chooses a thing from many options on the basis of certain value. i.e. to calculate grade on basis of percentage.</p> <p><b>Activity 4. (function)</b> Write a program that performs a task i.e. draw screen boundry many times. Use function with &amp; without arguments to do this task.</p>
Domain E Digital Citizenship	<p><b>Activity 1. (viruses)</b> Students discuss various categories of malicious code and their harms and protection against them.</p> <p><b>Activity 2. (Internet &amp; security)</b> Arrange a class discussion on using internet and its topics like rights of people on network, network security and importance of good passwords.</p> <p><b>Activity 3. (Soacial Media)</b> Discussion on SocialMedia related topics, its impact on society.</p>
Domain F Entrepreneurship in Digital Age	<p><b>Activity 1. (Internet marketing &amp; Business)</b> Students can watch a video on social media marketing, how they helps to start business, find out different social media websites that help business.</p> <p><b>Activity 2. (online transactions)</b> Search internet and learn about online payments and transactions, how to register or promote a business on social media.</p>



## Unit- Wise Distribution

		Domains	VI	VII	VIII
1	A	ICT Fundamental	18%	15%	17%
2	B	Digital Skills	25%	25%	23%
3	C	Algorithmic Thinking and Problem Solving	12%	18%	20%
4	D	Programming	25%	20%	18%
5	E	Digital Citizenship	10%	12%	10%
6	F	Entrepreneurship in Digital Age	10%	10%	12%
			100.00%	100.00%	100.00%

## Unit- wise Period Allocation (Theory – Practical)

Domains			VI		VII		VIII	
1	A	ICT Fundamental	8	3	7	2	8	2
2	B	Digital Skills	9	6	7	8	8	6
3	C	Algorithmic Thinking and Problem Solving	5	2	8	3	9	3
4	D	Programming	8	7	8	4	7	4
5	E	Digital Citizenship	4	2	5	2	4	2
6	F	Entrepreneurship in Digital Age	4	2	4	2	5	2
			38	22	39	21	41	19

## Guideline for Authors

In textbook writing generally the following aspects may be taken into consideration:

- The textbook should fulfill the objectives of teaching Computer Science (Grade VI Grade VII and Grade VIII)
- The author should continuously focus on standard, benchmarks and SLOs and skill sets defined in the curriculum outlines/skills.
- The textbook should be designed specifically to achieve the Competencies for grade VI to grade VIII.
- Textbook developers and designers should be aware of the Competencies of Computer Science and different domains (as reported in curriculum).
- Textbook developers should have sound knowledge of the discipline – Computer Science
- The content and sequence included in the textbook should be careful not to contradict some of the core principles of these disciplines.
- Textbook developers need to have a clear understanding of the pedagogy that is appropriate for the Competency and content (e.g., in language the balanced approach of including oral language, phonics and word solving instruction and meaning making needs to be incorporated)
- Textbook developers should be aware of the current technology and audio-visual materials available for enhancing learning experiences of students. Activities that involve digital technology and references to external material should be embedded appropriately in the textbook.
- The local context and environment is important in Grade VI to Grade VIII. Authors shall take care for the choice of content in the textbook. Moving from the familiar to unfamiliar is an important aspect of learning and the textbook should contain a balance of both familiar contexts that is a comfort for the children and unfamiliar contexts that should generate curiosity and challenge to students' thoughts and preferences.
- The textbooks should grab the attention of students. For Grade VI to Grade VIII, the balance between visual material and text should be tilted towards visual materials. The colour schemes and design themes should be attractive and consistent. The fonts and size of text material should be both visible and least confusing for students. The flow of

concepts, clarity in articulation and well-designed illustration to show the concepts/terminologies would be important.

- it is important to maintain diversity and inclusion as an important principle in the choice of content for textbooks. There are regional variations and these need to find adequate representation in textbooks. Balanced gender and community representation must be ensured.
- The topics/themes chosen would need to include the context of the student (including previous experiences, language) and scope for further exploration. The content at each Grade should be a precursor to the next. It is essential to ensure an alignment of the pedagogy and assessment with the content and the Learning Outcomes.
- Content in textbooks are largely directed towards students. It has been a practice to include notes for teachers in the textbook (It is recommended that for each textbook released for students, there should be a relevant textbook for the teacher for that student's textbook).
- The presentation of a textbook relies on the font size, images, sketches, the colours used, and on the amalgamation of the three e.g., textual content in the early Grades may be limited with a large number of images, font size should be large, and the illustrations used should be sensitive and inclusive. The language used would need to be Grade-appropriate and relevant to the subject.
- Textbook shall include notes for the teachers
- The textbook shall emphasize on critical thinking and more holistic, inquiry-based, discovery-based, discussion-based, and analysis-based learning. The content shall focus on key concepts, ideas, applications, and problem solving abilities.
- The chapters and its objectives/outcomes shall give clear direction as to what content is to be used for creating learning experiences for students [For example, concepts formed are perceptive in lower grades (e.g., colour as visually discriminated) and practical (e.g., spoon used as a lever to open a tin cover, money to buy things in a shop) but not theoretical (e.g., colour as a spectrum of light, lever as a simple machine, or money as a medium of exchange). Theoretical concepts be explored in the higher grades.]

- The content should be tied/bonded to building capacities and values that students need to develop through schooling at different grades. Special care should be taken to avoid promotion of stereotypes (i.e., fixed and distorted impression).
- The title page should be attractive and representative of the content of the textbook
- The textbook should include detailed table of contents
- Each chapter should report the outcomes of the chapter.
- The text should be clear and concise; unnecessary details must be excluded.
- The material should not be cramped. To make it more digestible, it may be chunked into smaller parts with headings.
- The textbook should be visually appealing and should maintain the interest of the students (i.e., use of pictorial views, images, use of innovative and attractive ways)
- The color scheme of pictures should be close to real life (i.e., 3D images)
- Activities/ Exercises must be designed related to 21st Century learning skills like critical thinking and problem solving as mentioned in the curriculum (e.g., see details at childnet.com or code.org or Oxford Series Level-1 to Level-9) [References: [https://www.mediafire.com/file/yovzo9oqdm6kmdm/Oxford\\_Computing\\_Book\\_6.pdf/file](https://www.mediafire.com/file/yovzo9oqdm6kmdm/Oxford_Computing_Book_6.pdf/file) (page#05) & (07) and [https://www.mediafire.com/file/n8f03plaaozpv2i/Oxford\\_Computing\\_Book\\_8.pdf/file](https://www.mediafire.com/file/n8f03plaaozpv2i/Oxford_Computing_Book_8.pdf/file) (page#03)]
- The author should bring himself/herself to the mental level of students, while he/she writes the chapters of the textbook.

### **Guideline for Teacher Educators (Trainers)**

The trainers (teacher educators) generally follow the following guidelines while training teachers of Computer Science (Grade VI to Grade VIII):

#### **General guidelines**

- Trainer ensures that teachers know themselves about the bloom's taxonomy levels (Cognitive, Affective and Psychomotor domains and their levels)
- Trainer ensures that teacher fully understands that students are of different wisdom/knowledge and background, thus, apply average level while explaining concepts.

- Trainer ensures that teacher knows that students make teachers their role model, thus, teacher should take care of his/her actions and selection of appropriate words while speaking to them.
- Trainer focuses that teachers make use of more class activities and discussion sections (Repeat the discussions to improve students' thinking ability)
- Trainer emphasizes that teacher provide accurate, concise and in simple words definitions of the concepts with real world examples.
- Trainer trains teachers to emphasize on discussion of students by forming groups of the students in the class.
- Trainer informs teachers to focus on the skills of the students in using technology and solving problems
- Trainer ensures that teacher should improve students' self-learning, collaborative learning approaches
- Trainer emphasizes that teacher monitors students' behavior towards classmates and safe use of ICT devices
- Trainer trains teachers to use less homework activities and increase class/lab activities, discussions, brainstorming sessions to build students' critical thinking mindset and expressing their ideas
- Trainer ensures that teacher teach students sportsmanship, gracefully accepting others' ideas and success/winning of competitions/games
- Trainer ensures that teacher focus on development of effective problem-solving and logical reasoning abilities in students.

Some effective guidelines for teacher educators based on best practices (Reference: Oxford) are reported in the following.

### **1. Model Exemplary Teaching:**

- i. Demonstrate effective teaching strategies: During workshops and training sessions, actively model diverse and engaging teaching methods aligned with current best practices. This sets a strong foundation for participants to learn and apply.

- ii. Embrace different learning styles: Showcase activities and techniques catering to varied learner preferences, demonstrating how to differentiate instruction in real-world scenarios.
- iii. Utilize technology for effective learning: Integrate technology seamlessly into your training sessions, demonstrating its potential to enhance engagement, interaction, and feedback.

## **2. Foster Collaborative Learning:**

- i. Create opportunities for peer interaction: Design activities and discussions that encourage participants to share experiences, ideas, and challenges with each other. This fosters collaboration, learning from diverse perspectives, and problem-solving skills.
- ii. Promote reflective practice: Encourage participants to critically analyze their own teaching practices, using peer feedback and collaborative discussions as learning tools. This fosters a culture of continuous improvement and reflection.
- iii. Build professional learning communities: Facilitate the creation of networks or online communities where teacher educators can continue to collaborate, support each other, and share best practices beyond the training program.

## **3. Bridge Theory and Practice:**

- i. Ground training in educational theory: Provide foundational knowledge in key educational theories, such as pedagogy, assessment, and curriculum development. This equips teacher educators with a strong theoretical framework to inform their own practices and guide their trainees.
- ii. Offer practical application scenarios: Ensure theoretical concepts are connected to real-world teaching challenges through case studies, simulations, and role-playing activities. This allows participants to apply knowledge in practical settings and develop effective solutions.
- iii. Focus on critical thinking and problem-solving: Encourage participants to analyze educational problems, research best practices, and design individualized solutions for diverse teaching contexts.

#### **4. Provide Ongoing Support:**

- i. Offer mentoring and coaching: Extend support beyond the training program by providing mentoring or coaching opportunities for aspiring or new teacher educators. This allows for personalized guidance, feedback, and problem-solving assistance.
- ii. Develop online resources and communities: Create online resources, such as webinars, discussion forums, and knowledge repositories, for ongoing access to information, support, and professional development opportunities.
- iii. Foster a culture of self-directed learning: Equip teacher educators with the skills and resources to actively seek out new knowledge, stay updated on current trends, and continuously improve their own teaching practices.

#### **5. Cultivate a Reflective Culture:**

- i. Model reflective practice: As a teacher educator, actively demonstrate and discuss your own reflective practices, encouraging participants to do the same. This normalizes reflection as a critical tool for professional growth.
- ii. Promote data-driven decision making: Encourage participants to collect and analyze data from their own teaching practices, utilizing it to inform decisions, set goals, and track progress.
- iii. Facilitate continuous feedback loops: Establish systems for regular feedback, both within training sessions and beyond, allowing participants to receive constructive criticism and guidance for improvement.

#### **Guideline for Teachers**

The concerned teachers generally follow the following guidelines while teaching Computer Science (Grade VI to Grade VIII):

##### General Guidelines

- The teacher selects and uses planning, preparation and assessment practices that progress students' learning

- Teacher uses appropriate digital technologies to support differentiated learning, enabling learners to take ownership of their individual learning needs.
- Teacher uses appropriate digital technologies to help students design projects and activities that engage them in collaborative problem solving, research, and/or artistic creation.
- Teacher ensures that students are able to work collaboratively in groups and complete and submit work at school and at home.
- Discuss other activities or tasks and accomplish them by carefully executing a set of steps. The focus should be on essence of steps involved in solving the problem.
- Teacher ensures that students use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs/problems.
- Teacher focus on how to use technology safely, respectfully and responsibly; recognise unacceptable behaviour; identify a range of ways to report concerns about content and contact.
- Teacher revises the importance of passwords, exploring cyberbullying and computer security and using an online space to safely share ideas. (class blog/shared google doc etc)
- Teacher ensures that students perform plugged and unplugged activities of computer accessories (i.e., keyboard, mouse, power cable) and discuss.
- Teacher ensures that students can represent data in different ways, collect, sort and present it in digital forms (Data Visualization using MS Word, MS Excel, MS PowerPoint etc).
- Teacher ensures that students can decompose simple problems and create simple sequences of instructions (e.g., how to make a sandwich, brush your teeth, bake a cake etc)
- Teacher ensures that students understand what algorithms are, how they are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions.
- Teacher ensures that students follow the problem-solving process to design and create a digital solution.
- Teacher ensures that students are familiar with and able to submit and complete work both at school and at home and are able to submit via online means (i.e., emails, Google Meet, MS Teams, Google Docs etc)
- Teacher ensures that students make choices based on rational analysis & on a ground understanding of the world and acting on those choices; this indicates that the student should



have the capacity for rational reasoning and sufficient knowledge to understand the world around him/her.

- Teacher ensures that students realize that a healthy mind and a healthy body are the foundations for them to pursue a good life and contribute meaningfully to society.
- Teacher ensures that students adopt healthy discussions for the creative and innovative ideas about problems surrounding them.
- Teacher ensures that students understand the discipline, hormone and cultural differences.
- Teacher ensures that students develop their ability to speak, listen, question, discuss, and write with clarity and conciseness – and with confidence and friendliness
- Teacher ensures that students engage in conversations/discussions based on events, stories, or their needs and asks questions. Besides, students demonstrate civilized behavior (waits for their turn to speak, and allows others to speak)
- While teaching-learning process is going on, Teacher observes and assesses-
  - Which student is actively participating in the discussion and contributing to it and which student is not able to do so.
  - Whether students are trying to explore for the possible solutions of a problem and are looking for the best one.
  - The extent of the participation of the students in group discussions, problem solving and their communication skills during these exercises.
  - How students are trying to solve the problem through various ways and are using appropriate methods for doing this.
  - Assessment in groups, peer assessment and opportunities for self-assessment also help in self-correction. Teacher should collect information and evidence through different sources, methods and techniques, record of information or evidence and make sense of collected information or evidence and share and communicate feedback.
- Teachers can use digital content available on the internet for supplementing the textbook material. Such content can enable different pedagogical approaches as well as provide different forms of engagement through audio-visual material.

**A Teacher shall:**

- Focus on learner-centered instruction: Create a classroom environment where students are actively engaged and responsible for their learning. This can involve project-based learning, group work, and differentiated instruction.
- Utilize evidence-based strategies: Base your teaching practices on research and best practices in education. This includes incorporating effective instructional methods, assessment techniques, and classroom management strategies.
- Promote effective communication: Develop clear and concise communication skills, both oral and written, to ensure accurate delivery of information and understanding among students.
- Create a positive and supportive learning environment: Foster a classroom atmosphere where students feel safe, respected, and valued. This encourages active participation, risk-taking, and collaboration.
- Provide regular feedback and assessment: Offer constructive feedback and utilize various assessment methods to monitor student progress, identify areas for improvement, and personalize learning.
- Provide regular and constructive feedback: Offer actionable feedback to students that motivates them to improve. Utilize formative and summative assessment to gauge progress, identify areas for growth, and personalize learning.
- Integrate technology thoughtfully: Leverage technology tools to enhance learning, connect with students, and facilitate engagement. However, prioritize meaningful interaction and critical thinking over technology dependence.
- Embrace continuous learning and reflection: Actively seek out opportunities to learn and grow as an educator. Reflect on your own teaching practices, analyze student data, and seek feedback from colleagues to continuously improve.
- Differentiate instruction to meet diverse needs: Recognize and cater to individual learning styles, strengths, and weaknesses. Modify materials, activities, and assessments to ensure all students have the opportunity to reach their full potential.
- Foster a growth mindset: Encourage students and yourself to embrace challenges and see mistakes as opportunities for learning. Cultivate a culture of resilience, perseverance, and lifelong learning.

## Revision/ Adaptation of Curriculum for Computer Education Grade VI -VIII

### Provincial Review Committee

- |    |   |                        |
|----|---|------------------------|
| 1  | <b>Dr. Naeem Ahmed Mahoto</b><br>Chairperson, Software Engineering Department, MUET Jamshoro                                | Chairperson            |
| 2  | <b>Muhammad Zahid Shaikh</b><br>Retired Professor, Computer Science Department MUET Jamshoro.                               | Member                 |
| 3  | <b>Mr. Abdul Majeed Bhurt</b> , Additional Director<br>Teachers' Training Institute, Hyderabad                              | Member                 |
| 4  | <b>Dr. Fida Hussain Chandio</b> , Professor<br>Institute of Mathematics & Computer Science, University of Sindh             | Member                 |
| 5  | <b>Mr. Ahmed Khan Zaur</b> , Deputy Director<br>Directorate of Curriculum, Assessment and Research Sindh Jamshoro           | Member                 |
| 6  | <b>Ms. Zufishan Shaikh</b> , Associate Professor<br>Govt. College for Information Technology, Guru Nagar, Hyderabad.        | Member                 |
| 7  | <b>Mr. Imran Pathan</b> , Instructor (Computer Science)<br>DETRC Latifabad Hyderabad  | Member                 |
| 8  | <b>Mr. Amjad Ali Yousuf Zai</b><br>Head Teacher, Govt. Boys' Mirza Qaleech Baig School, Hyderabad                           | Member                 |
| 9  | <b>Mr. Ajmal Saeed</b> , Assistant Professor Computer Science<br>Govt. Ghazalee College, Latifabad, Hyderabad               | Member                 |
| 10 | <b>Ms. Shahnaila Daudpota</b><br>HoD Computer Science, Public School, Hyderabad   | Member                 |
| 11 | <b>Mr. Mushtaque Ahmed Ansari</b> , Subject Specialist<br>Directorate of Curriculum, Assessment and Research Sindh Jamshoro | Committee<br>Secretary |



**GOVERNMENT OF SINDH  
SCHOOL EDUCATION & LITERACY DEPARTMENT**

Karachi, dated the 1<sup>st</sup>, February 2024.

**NOTIFICATION**

**NO. SELD/HCW/18/2018:** In compliance with the Section 3, sub-section (4), (e) of Sindh School Education Standards & Curriculum Act 2014, Sindh Act No. IX of 2015. School Education & Literacy Department, Government of Sindh is pleased to accord **No Objection Certificate** for approval of **Computer Science Curriculum for Grade VI to VIII and developing & printing of Textual Material as per the approved Curriculum**, after review by the review committee for Computer Science.

**DR. SHEREEN MUSTAFA  
SECRETARY TO GOVERNMENT OF SINDH**

**NO. SELD/HCW/18/2018:**

**Karachi, dated the 1<sup>st</sup>, February 2024.**

**A copy for information and necessary action to:**

1. The Chairman, Sindh Textbook Board, Jamshoro.
2. The Chief Advisor Curriculum Wing, School Education & Literacy Department, Government: of Sindh, Karachi.
3. The Director, Directorate of Curriculum, Assessment & Research, Jamshoro.
4. The P.S to Secretary School Education & Literacy Department, Government: of Sindh, Karachi.
5. The official website.
6. The office file.

**(ZULFIQAR ALI MIRANI)**

**SECTION OFFICER (CURRICULUM-A&T)  
For SECRETARY TO GOVERNMENT OF SINDH.**



**SCHOOL EDUCATION &  
LITERACY DEPARTMENT  
SINDH**

