

Zero Draft

Single National Curriculum

COMPUTER EDUCATION

Grade VI – VIII, 2020

ONE NATION, ONE CURRICULUM



**NATIONAL CURRICULUM COUNCIL,
MINISTRY OF FEDERAL EDUCATION & PROFESSIONAL TRAINING, ISLAMABAD
GOVERNMENT OF PAKISTAN**



Single National Curriculum for Computer Education

Grade VI – VIII
2020

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Chapter 1: INTRODUCTION

The vision of 'Knowledge Economy'¹ cannot actualize without promoting quality education in Pakistan. Education, both formal and informal, plays a vital role in economic and social development through boosting human productivity and social cohesion. Today, all nations are competing to build smart and quality human resources. The vision seeks to overcome and encourage the identification of indigenous solutions to local problems. This will require revamping of organization with increased resource allocations, and quantum improvement in the quality of service delivery through good governance and innovation.

The development of digital communications and collaborative technologies has transformed the world. Ideas and knowledge provide the base for economic growth and development, rather than materials and physical labour. The classroom provides the foundation for development. We are moving from an industry-based world economy to a knowledge-based economy.

To align the education system with the national development agenda, comprehensive reforms, comprising of detailed actions in curriculum, pedagogy, technology, governance, assessment as well as social and economic relevance will be made in education system to improve the quality of public schooling. These reforms will ensure that the educational system helps individuals in acquiring / sharpening of creative and analytical abilities and problem-solving skills, inculcates ethics and values, creates the appreciation of civil rights and civic responsibilities, promotes health and well-being, and encourages the pursuit of economic prosperity. These reforms aim to increase curiosity, critical thinking and innovation thus shifting the focus of education from memorization to critical learning and creating a bright future through enterprise, creativity and ethics.

Expectation from the curriculum is transforming in response to the rapidly changing ICT landscapes and demands imposed on 21st century learners. This curriculum will help educators prepare students for their ever-changing world by developing skills around 4Cs i.e. communication, collaboration, critical thinking, and creativity. It is widely accepted that students need to use technology appropriately and practice socially responsible behaviour

¹ Pakistan 2025 (One Nation – One Vision) - SDG 4 (Education) & SDG 9 (Innovation)

while developing the 4Cs to be productive, successful, and contributing citizens. Social responsibility and technology are underlying themes.

The curriculum will focus on the following features:

- Promote Project-Based and Student-Centric education
- Emphasize understanding and application, not content coverage
- Promote learning of tools that are useful and relevant
- Promote interdisciplinary learning
- Promote ethical and moral development of the students

The curriculum will transform students to be responsible, reflective, innovative, engaged, independent and lifelong learner. It will help learners develop skills in using computer systems and various application software such as Word Processing, Multimedia Presentation, Spreadsheet, and hosts of different educational software. It introduces learners to gather online resources and communicate globally. Information and communication technology is an applied subject and learners will require access to computer and Internet facilities to develop their skills. The practical sections of this curriculum can be achieved using various application packages that will allow learners to demonstrate the skills listed in the relevant sections. However, teachers are encouraged to help learners to realise that they can apply their skills to other relevant software as well.

The curriculum promotes opportunity for all genders enabling them to participate equally. During the teaching and learning process, teachers should be gender sensitive and balanced.

The curriculum is intended to encourage all students to continue their participation in education beyond the school. It is expected that many students with ability and interest in ICT will further continue their ICT education in their senior classes.

1.1. Aims

The overall aim of Computer Education in Pakistan is to develop responsible, reflective, innovative, engaged, independent, and lifelong learners. The curriculum aims to promote digital literacy among the students by:

- Enhancing students' capability to construct, explore, prototype, evaluate, foster logical thinking, solve problems, and collaborate using ICT tools.

- Encouraging students to develop a sense of wonder and curiosity about technological endeavours.
- Enabling students to use technology to acquire new knowledge and skills to solve problems.
- Preparing students to critically address social, economic, ethical, security and environmental issues related to technology.
- Providing students with a foundation in ICT that creates opportunities for them to pursue higher levels of study, prepare them for ICT related occupations, and engage them in technology-related activities appropriate to their interests, abilities and environment.
- Assisting students to use digital knowledge and skills to make decisions about the usefulness and worth of ideas.
- Nurturing digital talent to ensure a future digital community.

CHAPTER 2: STRANDS AND STANDARDS

The curriculum is intended to develop the ICT abilities of learners to meet the socio-economic needs of Pakistan, and to keep at pace with the world’s on-going rapid advancement. Our students need to be confident, creative, ethical, and effective users of latest technologies in addition to acquiring the knowledge, skills and attitudes required to cope with the changing world.

2.1. Strand-1: ICT Fundamentals

STANDARDS FOR GRADE 6 – 8	<ul style="list-style-type: none"> • Understand ICT components and their effective use. • Identify ways to ensure e-safety
Benchmarks	<p>The students are expected to:</p> <ol style="list-style-type: none"> 1. Recognize and differentiate ICT components 2. Use proper keyboarding techniques to reach an appropriate level of proficiency 3. Learn the use of Operating System 4. Select and use appropriate software for defined task. 5. Identify uses of technology in daily life 6. Identify and mitigate health hazards related to computer use. 7. Use ICT devices and internet services to ensure e-safety. 8. Understand and categorize different cybercrimes with consequences

2.2. Strand-2: Productivity through Technology

STANDARD FOR GRADE 6 – 8	<ul style="list-style-type: none"> • Have the knowledge and ability to solve real life problems using productivity tools appropriate to the task.
Benchmarks	<p>The students are expected to:</p> <ol style="list-style-type: none"> 1. Use productivity tools (3D Paint, Word Processing, Spreadsheet, Multimedia Presentation, Graphics, e-mail, etc) 2. Use learning tools (GeoGebra, PhET Simulation, etc) 3. Design and create interdisciplinary projects using available productivity tools.

2.3. Strand-3: Algorithmic Thinking and Problem Solving

STANDARDS FOR GRADE 6 - 8	<ul style="list-style-type: none"> Think algorithmically to develop strategy for problem solving
Benchmarks	<p>The students are expected to:</p> <ol style="list-style-type: none"> Identify the assumptions and known information in a problem statement. Design the steps in sequential order to solve the problem. Use programming languages (Scratch and Python) to solve simple computational problems.

2.4. Strand-4: Entrepreneurship in the Digital Age

STANDARDS FOR GRADE 6 - 8	<ul style="list-style-type: none"> Understand what is entrepreneurship and how technology has changed the entrepreneurial landscape
Benchmarks	<p>The students are expected to:</p> <ol style="list-style-type: none"> Understand entrepreneurship and types of entrepreneurs. Understand the difference between traditional and digital entrepreneurship. Identify how technology enhances and creates values for entrepreneurs. Understand how innovation plays a key role in entrepreneurship. Identify different components of a business plan.

2.4. PROGRESSION GRID: GRADE VI- GRADE VIII

Grade 6	Grade 7	Grade 8
ICT Fundamentals	ICT Fundamentals	Computer Networks and Security
Introduction to ICT	The System Unit	Introduction to networks
The Components of computer	Uses of ICT	Uses of ICT
Health related issues of using ICT devices		Computer Security Threats
System Software		Antivirus
Introduction to System Software	Emerging Technologies	Emerging Technologies
Introduction to Operating System		
Application Software	Application Software	Application Software
Working with Paint 3D	Multimedia Presentation	Multimedia and Graphics
Using Rapid Typing Tutor	Applications of GeoGebra	Working with Spreadsheet
Working with Word Processor	Introduction to PhET Simulation	
Problem Solving	Problem Solving	Problem Solving
Introduction to Problem Solving		Introduction to Python through Turtle Graphics
Working with “Scratch”	Working with advanced concepts of “Scratch”	Programming with Python
Internet Basics	Electronic Mail	Web Applications - Learning Platforms and Social Media
Introduction to Internet	Introduction of E-mail	Working with MOOCs
Services of Internet	Send and Receive Email	Effects of Social Media
ICT – Ethics and Security	Cyber World	Cyber Crime Laws
Internet Ethics	Major Online Activities	Cyber Crime Laws
Entrepreneurship in the Digital Age	Entrepreneurship in the Digital Age	Entrepreneurship in the Digital Age
Entrepreneurship	Technology as an enabler in entrepreneurship	Business Plan
Traditional vs Digital Entrepreneurship	Entrepreneurship and Innovation	Digital Marketing

CHAPTER 3: STUDENTS' LEARNING OUTCOMES**3.1. GRADE VI**

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Chapter 1: ICT Fundamentals	Define ICT			
Introduction to ICT	Identify various ICT devices		Show various ICT devices and encourage students to name them.	
	Define a computer			Computer Basics What is a Computer.mp4
	Differentiate between data and information		Collect demographic information of the class and analyse it.	

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Explain the advantages and daily usage of ICT Devices</p> <ul style="list-style-type: none"> ● Communication applications (Print media, digital media etc.) ● Measurement applications (digital experiments, weather stations etc.) ● Applications in manufacturing 		<p>Identify different ICT devices and their uses in your surroundings (e.g. Home, School, etc.).</p>	

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	industries (robotics in manufacture and production line control)			
	Design the ICT Lab Rules	Describe good governance, rule of law, democratic process and transparency Understand that accountability is important for deviant behaviours	Working in groups, students recommend some rules to be followed in ICT Lab Prepare charts related to ICT laboratory Do's and Don'ts	

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
The Components of a Computer	<p>Differentiate between hardware and software</p> <p>Differentiate between system and application software</p> <p>Identify hardware and components of computer:</p> <ul style="list-style-type: none"> • Input Devices (Keyboard, Mouse, Scanner (Handheld, Flatbed, QR Reader, Biometric), Microphone, 		<p>Demonstrate the hardware components by assembling/ disassembling the system unit.</p> <p>Prepare worksheets regarding identification and labelling of Components</p>	<p>Computer Basic Parts of a Desktop Computer .mp4</p>

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Digital Camera, Sensors etc) • System Unit (Processor, Memory Unit, System Board etc) • Storage Devices (Hard Disk (Internal and External), CD/DVD/Blu-ray Disk, USB Flash Memory/ Memory Card etc) • Output Devices (LCD/LED/SMD, Printer, Speakers, Multimedia			

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Projector, Actuator, etc) • Communication Devices (Switch, Router, AP, DSL Modem, Bluetooth, WiFi Router, LiFi, etc.)			
Health related issues of using ICT devices	Identify health risks and its mitigations from ICT Devices Discuss the following health related issues of using technology and suggest solutions	Make a list of good and bad habits in terms of ICT in health	Design a campaign of community awareness about adverse effect of ICT on health	Computer Basics Creating a Safe Workspace.mp4

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>to avoid these problems:</p> <ul style="list-style-type: none"> ● Posture-related injuries, like Back and Neck ache, Muscle and joint problems, Carpal Tunnel Syndrome and Repetitive Strain Injury ● Eyestrain, Computer Vision Syndrome and Photosensitive 			

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>epileptic seizures</p> <ul style="list-style-type: none"> ● Behavioural problems ● Obesity issues ● Discuss Sleeping Disorders and Decrease in Productivity 			
	Explain and rehearse earthquake drills (duck, drop and hold on) and fire drills in computer lab	Explain earthquake drills (duck, drop and hold on) and fire drills in computer lab	Rehearse earthquake drills (duck, drop and hold on) and fire drills in computer lab	

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Chapter 2: System Software Introduction to System Software	Understand the basic types of system software (operating system, device driver, utility programme) with examples. Explain the functions of Operating System		List different examples of system software	What is Software? https://www.youtube.com/watch?v=KZ8fFRoWfmM Types of System Software, Computer Science Lecture Sabaq.pk https://www.youtube.com/watch?v=dBTtmaWjCR8 Computer Basics: Understanding Operating Systems https://www.youtube.com/watch?v=pTdSs8kQqSA
Stepping into windows	Identify the steps of start-up procedure for Windows		Demonstrate the booting, shut down, desktop items, start button/menu, Task Bar components, Snipping Tool,	

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Recognise the Desktop Environment		Windows Store and Working with Active Window	
Managing Files and Folders	<p>Define a File, a Folder, shortcut and a drive (with examples)</p> <p>Create a new file, folder and shortcut.</p> <p>Cut, copy, and paste a file/folder to another folder / location</p>		<p>Create, Cut, copy paste, rename and delete the file folder and shortcut.</p> <p>Create folders, rename them with your classmates and create files inside these folders and also rename them, copy/paste in other folders/ locations.</p>	Windows Basics Getting Started with the Desktop.mp4

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Drag and Drop a File/Folder to another Folder / Location Delete a File /Folder			
Chapter 3: Application Software	Understand application software and its usage. Identify the use of entertainment software, educational			

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	software, productivity software			
Working with Paint 3D	<p>Understand the purpose of Paint 3D as a design tool</p> <p>Draw free hand drawings with different brush types</p> <p>Draw an image using 2D shapes like lines, circles, polygons, etc.</p>		Prepare 3D images and objects on different topics of ICT, Geography, English etc using different tools and shapes	https://www.youtube.com/watch?v=QLMBSoeVPao

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Draw an image using 3D shapes Add text to a drawing Save a file and open saved files. Apply the drawing tools to draw an image.			
Using Rapid Typing Tutor	Recognize the following <ul style="list-style-type: none"> ● Keyboard layout / keys (digits, letters, 			https://youtu.be/nTknHArU1L8

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>special characters etc.) on keyboard</p> <ul style="list-style-type: none"> ● Different rows of keys on the keyboard <p>Know how to</p> <ul style="list-style-type: none"> ● Place fingers on correct positions on keyboard ● Type the right character ● Use of different keys that are used 			

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>for editing the typed text</p> <p>Improve the typing speed with accuracy by practicing various lessons</p>			
Working with Word Processor	<p>Understand the purpose of Word Processor Packages and list few word processing software</p> <p>Add and modify text to a document</p> <p>Save and open files</p> <p>Format a document</p>		<p>Prepare following tasks using different features of word processing software:</p> <ul style="list-style-type: none"> • Letter / application, • Time table, • Story with pictures in English or Urdu, • Invitation card, 	<p>https://www.youtube.com/watch?v=UqfnQ3x4RMQ&list=PLi5naV3Zc91pWRq_MpsVNr0Ts6Po08xiX</p>

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Insert, resize and caption images in the document</p> <p>Cut, copy, and paste text/image in a document</p> <p>Use spell check</p> <p>Create and modify numbered and bulleted lists</p> <p>Work with tables</p> <p>Use different Print Options</p>		<ul style="list-style-type: none"> Result card. <p>Prepare a detailed CV with picture, academic details, personal interests etc. and print using different options</p>	

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Learn to type in Urdu using Phonetic keyboard layout			
Chapter 4: Problem Solving Introduction to Problem Solving	Given a problem statement, identify <ul style="list-style-type: none"> • What is given - facts • Data needed to solve the problem - input • The output of the problem given certain input Given a problem statement, be able to extract out important information		Given a recipe, determine ingredients This includes several unplugged activities: 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 given a set of instructions, etc. Given a sequence of numbers, determine the next number	https://classic.csunplugged.org/

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Understand what is an algorithm and design a set of step-by-step instructions to solve a problem</p> <p>Determine output of a problem, given a set of step-by-step instructions</p> <p>Decompose a problem into sub-problems</p> <p>Integrate solutions to sub-problems to solve the main problem</p>		<p>Guess the identity of a classmate given a set of qualities/features.</p> <p>* Please consult note at the end of section for detail</p>	

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Given data and facts, be able to reason about conclusion</p> <p>Introduction to algorithm through simple daily life problems</p>			
Working with Scratch	<p>Understand the purpose of Scratch as a simple problem solving tool</p> <p>Recognize the User Interface of Scratch</p> <p>Create animation scripts</p>		Prepare programs like moving ball, geometrical patterns, build house, draw shapes, balloons, rockets in space, hangman, etc.	https://www.youtube.com/watch?v=9Ta4jNtPzI

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Use and create sprites Use and create backdrops/scenes Use motion and events Repeat set of steps using repeat, forever, and wait Create simple animations Demonstrate control of on-screen characters. Design and implement storyboards.			

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Chapter 5: Internet Basics Introduction to Internet	Understand the concept of Network Understand that Internet is the world's biggest network			What is the Internet? https://www.youtube.com/watch?v=Dxcc6ycZ73M
	Identify advantages of the internet in different sectors like education, business, entertainment etc.		Enlist the internet usage e.g. education, information, entertainment, online business, shopping etc.	
	Identify principle means of connecting to the internet <ul style="list-style-type: none"> ● DSL (Explain ISP) ● Hotspot 		Enlist different ISPs and companies providing 3G 4G services operating in Pakistan.	Computer Basics Connecting to the Internet.mp4

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<ul style="list-style-type: none"> ● 3G / 4G / 5G (Explain Cellular Networks) 			
Services of Internet	Define the following services provided by the Internet in daily life. <ul style="list-style-type: none"> ● World Wide Web ● Instant Messaging ● Social Media ● Email ● Video Conferencing ● Navigation System 		Identify the services that you use in your daily life	
World wide web	Understand the meaning of following terms	Understand that the internet is the source		What is the world wide web? https://www.youtube.com/watch?v=J8hzjxb0rpc

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<ul style="list-style-type: none"> • Website • URL • Web browser 	of information from around the world		
	Use web browser to access and view different web pages		Bookmark the relevant web pages Set www.google.com as a home page	
	Understand Search Engine and Meta Search Engines Use search engines (Google, Bing, Yahoo etc.) effectively		Perform search with same keywords in different search engines Use search engines to find an appropriate information like text, image, audio, video etc on different curriculum-based topics	

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Use different searching techniques (Boolean to refine the search)</p> <p>Identify authentic and reliable searched content</p>		Discuss and list authentic sources of information for health, news etc	
Chapter 6: ICT- Ethics and Security	<p>Understand what ethics is and what constitutes an ethical issue</p> <p>Identify and discuss ethical issues that arise in ICT</p>	Define integrity and list ways in which integrity can be practiced.	Prepare a chart of ethical rules regarding use of ICT and display it.	

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Understand the importance of being safe, responsible, and respectful online.			
	Understand the key concepts of copyright, plagiarism and piracy. Know the consequences of violating copyright and software licenses	Recognize the importance of referencing the sources		
	Identify			Computer Basics Protecting Your

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<ul style="list-style-type: none"> • Improper use of computer resources • Steps to Secure information privacy and confidentiality <p>Know the possible dangers of the internet and related security measures.</p>			Computer.mp4
Internet Ethics	<p>Understand Internet Ethics related to:</p> <ul style="list-style-type: none"> • Acceptance • Sensitivity to International, 	Recognize that all individuals are equal and must be treated with equal respect despite		

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	National and Local cultures <ul style="list-style-type: none"> ● Email and Chatting ● Impersonation ● Abusive language ● Personal & Private information ● Downloading Software & Content 	their social status or profession. Understand cultural differences globally Identify and understand the issues affecting the local community (environment, social, political, economic or others) and suggest ways in which these can be countered through collective actions.		

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Define <ul style="list-style-type: none"> ● Cyber Ethics ● Cyber Safety ● Cyber Security ● Acceptable User Policy and its implementation 	Recognize cyberbullying as a negative trait and understand the effect it has on the victim.		
Chapter 7: Entrepreneurship in the Digital age Entrepreneurship Traditional vs Digital Entrepreneurship	Define the term "Entrepreneurship" Identify different types of entrepreneurs Present a few examples of entrepreneurs.			

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Define traditional entrepreneurship Define digital entrepreneurship List examples of traditional entrepreneurs and digital entrepreneurs			
	<p>* Explanation regarding suggested activities for the topic “Problem Solving”: These are activities done on paper and not on a computer. The focus is for students to learn problem solving techniques. The first objective is for students to be able to extract information from a problem description. For example, the problem says:</p> <p>Australian cricket team is visiting Pakistan and will play three T-20 matches. The first match is in Lahore, the second in Peshawar and third in Karachi. I live in Peshawar and I would like to go and see the match in the stadium. Each ticket costs 100 Rupees and you have to buy the tickets one week before the day of the match. When should you buy the tickets?</p>			

GRADE VI - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Given: There will be a match in Peshawar</p> <p>Input: When is the second match (which date)</p> <p>Output: When should we buy the ticket?</p> <p>The second objective is for students to be able to exclude information that is irrelevant to the problem we are trying to solve and only extract useful information.</p> <p>Extra information: Location for first and last matches.</p> <p>The third objective is for students to be able to solve a problem by giving step by step instruction and be able to follow step-by-step instructions given to solve a problem. A relevant activity will be to instruct the student to write instructions for drawing a shape – maybe a house or a tree. The students should be divided into teams of two where the first person writes the steps and the other student follows the steps. The second student does not know the shape that is being drawn. Students have to make sure they give precise instructions for their team member to be able to draw the shape.</p> <p>The next two objectives are to decompose a problem into subtasks, solve each subtask, and then put them together to solve the bigger problem. You want to make the national flag with pieces of paper, what kind of shapes do you need. You need green paper, white paper, a crescent cut out from white paper, and a star cut out from white paper – this is decomposition. Then put it all together once you have solved each problem to solve the original problem.</p>			

3.2. GRADE VII

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes	Values	Suggested Activities	Suggested Resources
Chapter 1: ICT Fundamentals The System Unit	Students should be able to: Recognize the main components of System Unit <ul style="list-style-type: none"> • Motherboard • Processor (Control Unit, ALU, MU) Differentiate RAM and ROM Identify and understand the use of Ports (HDMI, USB, Card Reader etc.)		Demonstrate all components by assembling/disassembling the system unit. Prepare worksheets regarding identification and labelling of Components of system unit	
Uses of ICT	Explain the advantages and daily usage of ICT Devices <ul style="list-style-type: none"> • Data handling applications (school reports and school libraries etc.) • Booking systems (travel industry, cinemas etc.) 		Prepare charts regarding daily uses of ICT devices and display them.	

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<ul style="list-style-type: none"> Banking applications (Electronic Funds Transfer (EFT), ATM etc.) 			
Emerging Technologies	Describe how emerging technologies have an impact on everyday life (e.g. artificial intelligence, biometrics, robotics, computer assisted translation, 3D and holographic imaging, virtual reality, Cloud Computing)		Prepare a presentation on the impact of any three emerging technologies.	
Chapter 2: Application Software	Understand the purpose of multimedia presentation.			
Multimedia Presentation				
	<p>Use design templates to start a new presentation</p> <p>Create slides using different layouts</p>		Prepare a presentation and present it (in relevant subject period) on any interdisciplinary topic based on	

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Add and format text to a presentation</p> <p>Add pictures, videos, sounds and shapes to presentation</p> <p>Apply animations to highlight information</p>		<p>research by using following features:</p> <ul style="list-style-type: none"> ● Title slide ● Slide layout ● Slide design ● Formatting ● Animation ● Pictures ● Clip art ● Slide transition ● Slide show <p>Maximum slides: 10</p>	
Applications of GeoGebra	<p>Understand the use of GeoGebra in visualization of Mathematical applications</p> <p>Recognize the interface of GeoGebra</p> <p>Understand the Algebra View and the Graphics View</p> <p>Use different algebra and geometry tools</p>		<p>Use menus and basic tools to solve mathematical problems on Algebra and geometry to demonstrate integration in Mathematics</p>	<p>https://youtu.be/jSHVCBKQA00</p> <p>https://youtu.be/0qkwiCKO1eA</p>

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Construct 2D shapes of geometry</p> <p>Transform shapes by dragging, rotating and changing parameters</p> <p>Observe the effects on the results of different arithmetic functions by using sliders or entering data</p>		<p>Modify already available classroom resources by dragging free objects or by using sliders</p>	<p>https://youtu.be/p1xeRhgEB2U</p>
Introduction to PhET Simulation	<p>Define the purpose of PhET Simulation</p> <p>Understand the basic features of PhET platform</p> <p>Browse through subject/topic wise simulations</p> <p>Reflect on importance of simulations in concept development / topic help</p>		<p>Hands on practice to understand the platform.</p> <p>Identify different simulations per subject which can help understand the topics and explain why they think the selected ones are good/effective.</p>	<p>https://phet.colorado.edu/</p> <p>Access to computers with internet connectivity, ideally with one computer for two students.</p>
Chapter 3 Problem Solving	<p>Create basic step by step animation (loops, events, and parallelism techniques)</p>		<p>Customize music, colour and costumes of an animation</p>	<p>https://www.youtube.com/watch?v=7gkSbtpmpXI</p> <p>https://www.youtube.com/watch?v=PfQiTBbHHY4</p>

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Working with Advanced Concepts of "Scratch"	<p>Demonstrate the use of Motion commands</p> <p>Demonstrate the control of on-screen characters</p> <p>Implement key game features (Scoring, Collisions, Timers)</p>		<p>Develop programs for</p> <ul style="list-style-type: none"> ● Create your own story ● Virtual aquarium with moving fish and sound effects, ● Tic-Tac-Toe, ● Snake game, ● Maze games up to two levels, ● Racing car, ● etc 	
<p>Chapter 4:</p> <p>Electronic mail</p> <p>Introduction to E-mail</p>	<p>Define email and list some email service providers</p> <p>Explain how email services have impacted the communication between people locally and globally</p> <p>Define the following terms</p> <ul style="list-style-type: none"> ● Email address ● Password 		<p>Use an email service to create an email address (or use one if it already exists) to send greetings to peers, respond to emails received.</p>	<p>Access to computers with internet access, ideally one computer to one student.</p> <p>Access to one or more email service websites online.</p>

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Send and receive emails using email services	<ul style="list-style-type: none"> ● Contacts <p>Know how to</p> <ul style="list-style-type: none"> ● Use an email service to create an email account. ● Send and receive emails with attachment. ● Organize emails using different folders/labels <p>Understand and explain why signing out is important.</p> <p>Understand the legal and moral implications in case of unethical use of email.</p>		<p>Develop a brief acceptable use policy (ethical dimension) regarding email use in the classroom with a rationale.</p> <p>Share the acceptable use policy as attachment with the teacher via email. Sign out the account before leaving the lab facility.</p> <p>Discuss among yourself how email helps in achieving paperless office environment</p>	

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Chapter 5: Cyber World	Define Cyber crime Understand consequences of cyber crime Understand safe online behaviour	Understand and describe how the societal rules are set and how people take part in changing them. Understand the value and benefit of being diplomatic and putting across opinions, ideas and thoughts in an inoffensive and polite manner in interactions. Understand the rights of others (space, property, belongings) and realize the consequences of encroaching on another's right.	Perform research on www.nr3c.gov.pk regarding cyber-crimes and cyber laws in Pakistan and prepare a PowerPoint presentation based on this research. Prepare a presentation based on any cyber-crime movie or story (relevant/ age appropriate). Discuss PTA Responsibilities with respect to cyber crime	

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
		<p>Understand the rights of others (space, property, belongings) and realize the consequences of encroaching on another's right.</p> <p>Understand that accountability is important for deviant behaviour. develop values and skills that enable people to live together peacefully (respect, equality, caring, empathy, solidarity, tolerance, inclusion, communication, negotiation, managing and resolving conflict, accepting different</p>		

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
		<p>perspectives, non-violence)</p> <p>Understand the rights of others (space, property, belongings) and realize the consequences of encroaching on another's right.</p>		
Major Online Activities	<p>Understand the following</p> <ul style="list-style-type: none"> ● Social networking ● Online banking ● Audio & video communication ● Entertainment ● Online shopping ● Navigation / GPS ● Online education ● Online auction ● Medical assistance ● Online games 			

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes	Values	Suggested Activities	Suggested Resources
	Students should be able to: Describe briefly Cyber Crime Categories <ul style="list-style-type: none"> ● Hacking ● Identity theft ● Cyber Bullying ● Cyber Stalking ● Financial fraud ● Digital Piracy ● Computer viruses and worms ● Violation of Intellectual property rights ● Electronic Terrorism, Vandalism and Extortion 			
Chapter 6: Entrepreneurship in the Digital age Technology as an enabler in entrepreneurship Entrepreneurship and innovation	Understand the role of technology in entrepreneurship Understand innovation and its connection to problem solving List examples of innovation		Case study. Think of a business idea, and formulate a business plan	

GRADE VII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Identify steps to start a new business			

3.3. GRADE VIII

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Chapter 1: Computer Networks and Security Introduction to Networks	Understand the components of computer network (Sender, Message, Receiver, Medium)		Draw and label basic computer networks.	
	Show understanding of a client-server model			

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	Explain the types of computer networks <ul style="list-style-type: none"> ● LAN ● WAN ● VPN 			
	Explain the types of physical transmission media: <ul style="list-style-type: none"> ● Guided (Twisted Pair, Coaxial, Fibre Optics) ● Unguided (WIFI & LiFi) 			
	Briefly explain the following terms <ul style="list-style-type: none"> ● Cellular Communication ● Satellite Communication 			

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<ul style="list-style-type: none"> ● Global Positioning System ● Bluetooth 			
Uses of ICT	<p>Explain the advantages and daily usage of ICT Devices.</p> <ul style="list-style-type: none"> ● Computers in medicine (patient records, pharmacy records, monitoring and expert systems for diagnosis etc.) ● Expert systems (Mineral prospecting, car engine fault diagnosis, chess games etc.) ● Computers in the retail industry (POS, EFTPOS, online shopping etc.) 			

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<ul style="list-style-type: none"> • Recognition systems (Biometric, MICR, OMR, OCR, RFID etc.) • Satellite systems (Global Positioning Systems (GPS) through satellite navigation) • ICT in Education (Blended Learning, Flip Classrooms, etc.) 			
Computer Security Threats	<p>Identify the causes of how virus, worm and adware can spread through:</p> <ul style="list-style-type: none"> • Infected external memory drives • E-mail attachments • Surfing insecure websites 			

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<ul style="list-style-type: none"> Installing pirated software 			
Antivirus	<p>Understand the role of antivirus software</p> <p>List some widely used antivirus software e.g. Avast, ESET, Symantec, McAfee, AVG, etc</p>		<p>Install and update an antivirus and scan different drives for viruses</p>	<p>Do You NEED an Antivirus? Are They Obsolete?</p> <p>https://www.youtube.com/watch?v=cT_uCi8hmv0</p> <p>Windows 10 - Free Avast Antivirus - How to Install Free Antivirus for Windows 10</p> <p>https://www.youtube.com/watch?v=oDs3oePxVtM</p>

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Emerging Technologies	Understand the concept of <ul style="list-style-type: none"> ● IoT (Internet of Things) ● Embedded Systems ● Edge Computing ● Data Analytics 		Prepare a presentation on the impact of any three emerging technologies. Identify IoT Devices Explore Cloud Computing in Pakistan	Top 10 Internet of Things (IoT) Trends That Will Rule in 2020. https://www.youtube.com/watch?v=crDyC6XeqsE 7 amazing technologies we'll see by 2030 Computer Basics: What is the Cloud? https://www.youtube.com/watch?v=gu4FYsFeWqg&t=2s
Chapter 2: Application Software	Understand the concept of multimedia and graphics.		Practice creating, editing, combining and exporting images, audio &	Multimedia & Multimedia Elements https://www.youtube.com/watch?v=HJ8nkUSkG9E

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Multimedia and Graphics	<p>Identify different multimedia files types</p> <p>Create and edit images using relevant graphics software.</p> <p>Transfer images from different devices.</p> <p>Create videos using age appropriate video making tool (e.g. Windows Movie Maker)</p>		<p>video files using relevant software</p> <p>Make a photo collage.</p> <p>Develop a themed project using appropriate images, sound, video etc</p>	<p>Learn Photoshop in 5 MINUTES! Beginner Tutorial</p> <p>https://www.youtube.com/watch?v=KAmSB5MQxOo</p> <p>Adobe Photoshop Tutorial : The Basics for Beginners</p> <p>https://www.youtube.com/watch?v=pFyOznL9UvA</p> <p>LEARN MOVIE MAKER IN 15 MINUTES ! TUTORIAL FOR BEGINNERS</p> <p>https://www.youtube.com/watch?v=O99NXVHfqMs</p>

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Working with Spreadsheet	<p>Understand the purpose of spreadsheet software</p> <p>List different spreadsheet software e.g. Excel, Google Sheets, OpenOffice.</p> <p>Understand the user interface of spreadsheet software.</p> <p>Create, save and open workbook</p> <p>Organize data in worksheets within a workbook</p> <p>Use simple built-in functions (e.g. sum, average, minimum, maximum)</p>		<p>Prepare worksheets including Result sheet, Personal contact directory, Home budget (for specific income), Electricity bill etc.</p>	

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Create simple formulae (arithmetic operations)</p> <p>Create appropriate chart for data presentation</p>		<p>Prepare Charts/graphs on a balanced diet, cricket match score etc.</p>	
<p>Chapter 3: Problem Solving</p> <p>Introduction to Python through Turtle Graphics</p>	<p>Understand the purpose of IDLE as a coding environment for Python</p> <p>Understand the user interface of IDLE to create, save, and run a Python script</p> <p>Use comments to describe an algorithm</p> <p>Draw shapes using Turtle Graphics functions</p>		<p>Write a python program to draw the following letter "L" shape</p> <p>Write a Python program to create a small square inside a big square</p>	<p>https://www.youtube.com/watch?v=QYpfZYq8WPA</p>

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Translate sequential algorithms into Python code</p> <p>Recognize the situation where loops should be used.</p> <p>Identify problems that can be solved using a counting loop</p> <p>Break up a problem into smaller sub-problems</p> <p>Build a solution to a problem from solutions to sub-problems</p>		<p>Create national flag by creating rectangles, crescent, and star etc</p>	
Programming with Python	<p>Understand the concept of variables.</p> <p>Practice the rules for naming variables.</p>		<p>Write a Python program that takes the radius of a circle from the user, computes the area, and prints it.</p>	<p>https://www.youtube.com/playlist?list=PLsk-HSGFjnaGe7sS_4VpZoEtZF2VoWt oR</p>

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Differentiate built-in data types</p> <p>Take input from the user and manipulate it and display results.</p> <p>Create expressions using arithmetic operators (add, subtract, multiplication, division)</p> <p>Recognize the importance of decision-making in programming.</p> <p>Create expressions using relational operators (<, >, ==, !=, <=, >=)</p>		<p>Sample Output: Enter the radius of the circle: 2.1 The area of the circle with radius 2.1 is: 13.8544119</p> <p>Write a python program that asks the user for a year and checks if this year is a leap or not</p> <p>Write programs using for loop.</p> <p>Write programs using while loop</p>	

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	<p>Use conditional statements if, if-else.</p> <p>Use primitive loops in problem solving context</p> <p>Compare primitive loops</p>			
<p>Chapter 4: Web Applications - Learning Platform and Social Media</p> <p>Working with MOOCs</p>	<p>Understand the purpose and importance of MOOCs (Massive Open Online Courses)</p> <p>List few examples of MOOCs</p> <p>Explore digitized lessons on education portals</p>		<p>Review some examples of MOOCs, especially which can help current level of learners, for example, e-Learn Punjab and Khan Academy, edX.org</p>	

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
			<p>(Education Portals).</p> <p>Register and explore an online course (Elementary English) on https://moec.com/courses/elementary-english-course.</p> <p>Explore how MOOCs are dramatically changing the way world learns</p>	

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Effects of Social Media	<p>Identify positive and negative impacts of using social media, both on-line and off-line.</p> <p>Identify the uses of social media platforms (e.g Facebook, Twitter, LinkedIn, Instagram, Snapchat, Pinterest, etc.).</p> <p>Recognize social media as a learning tool</p>	<p>Recognize that all individuals are equal and must be treated with equal respect despite their social status or profession.</p> <p>Define empathy</p> <p>Understand the different ways in which they can practice empathy with others.</p>	Explore cyber bullying cases	<p>Social Media for Education.mp4</p> <p>Incorporating & accounting for Social Media in Education Harry Dyer TEDxNorwichED.mp4</p> <p>Social Media and Technology in the Classroom.mp4</p> <p>Using Social Media in the Classroom.mp4</p>

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Chapter 5: Cyber Crime Laws	<p>Understand the impact of Cyber Crimes</p> <p>Know the cybercrime laws in Pakistan</p> <p>Understand the consequences of inappropriate online behaviour</p> <p>Recognize the situations where help is needed with respect to Cyber Crime.</p>	<p>Understand the rights of other (Space, property, belongings) and realize the consequences of encroaching on others right.</p> <p>Recognize the negative connotation of greed and acquiring something through wrong actions.</p> <p>Define the term cheating and describe the</p>	<p>Analyse the ways in which ICT is used to commit cybercrime</p> <p>Register on Cyber Scout Program – “Cybercrime Wing-FIA” (www.nr3c.gov.pk) as Cyber Scout</p> <p>(Note: Prerequisite a valid E-mail address)</p>	

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
	List the authorities designated to help victims of Cyber Crimes.	<p>consequences of cheating.</p> <p>Understand that accountability is important for deviant behaviour.</p> <p>Understand that fairness demands inclusion of all voices in decision making and the supremacy of law particularly with regard to accusations which should be investigated on the basis of evidence.</p>	Discuss different recent cases of cyber-crimes that took place in Pakistan	

GRADE VIII - LEARNING CONTENTS AND THE STUDENTS' LEARNING OUTCOMES				
Contents	Students' Learning Outcomes Students should be able to:	Values	Suggested Activities	Suggested Resources
Chapter 6: Entrepreneurship in the Digital Age Business Plan Digital Marketing	Understand Business Plan Define Value Proposition Define Marketing Define Digital Marketing List Digital Marketing Techniques and tools		Design digital marketing content (advertisement) using digital tools.	

Chapter 4: TEACHING AND LEARNING

The purpose of this curriculum is to develop, in students, digital literacy and positive attitudes about using ICT as a way of obtaining knowledge. Students will be expected to learn ICT skills, communicate using ICT tools, and use their knowledge of ICT concepts and principles to reason and to solve problems in real life situations. The vision of Computer Education calls for a shift in the focus of teaching and learning. This can only be accomplished by providing students with opportunities to explore the context of ICT and its applications, and to develop an understanding of the interconnections among ICT, other subjects, society, and environment.

The learning and teaching of this curriculum is designed to focus on:

- Preparing students to cope with rapid technological changes
- Learning according to students' interest, aptitude and ability so that student learning is sustainable
- Learning through authentic situations
- Learning and making progress through appropriate feedback and assessment

A Learner-Centric approach will be adopted for the delivery of this curriculum with teachers only focusing on introducing basic concepts and leaving ample space for students to develop themselves according to their own interests. Students will drive their own learning with structured tasks and projects through which they can gain confidence and knowledge by incorporating teachers' feedback regularly. They will be encouraged to stay at par with the advancements in technology by reading authentic journals, magazines, and websites. This approach ensures optimal quality of learning when the following principles are put into practice. The aim is to develop learning with understanding, and the skills and attitudes to contribute to the development of society. The foundation of teaching and learning lies on the fact that the learner brings to the school a wealth of knowledge and social experience gained continually from the family, the community, and through interaction with the environment.

Learners achieve best results when they are actively involved in the learning process through a high degree of participation, contribution, and production. At the same time, each learner is an individual with his/her own needs, pace of learning, experiences and abilities. Teachers should use differentiated teaching strategies to accommodate learners with

varying abilities and experiences. The teacher must be able to sense/evaluate the needs of the learners, the nature of the learning to be done, and how to shape learning experiences accordingly. Teaching strategies must therefore be varied but flexible within well-structured sequences of lessons. The teacher must decide, in relation to the learning objectives and competencies to be achieved, when it is best to convey directly; when it is best to let learners discover or explore information for themselves; when they need directed learning; when they need reinforcement or enrichment learning; when there is a particular progression of skills or information that needs to be followed; or when the learners can be allowed to find their own way through a topic or area of content.

The student-computer ratio should be considered when planning lessons. Cooperative and collaborative learning should be encouraged wherever possible. In such cases, tasks must be designed so that pair or group work is needed to complete it, otherwise the learners will not see any relevance in carrying out tasks together. As the learners develop personal, social and communication skills, they can gradually be given increasing responsibility to participate in planning and evaluating their work, under the teacher's guidance.

During the past few decades, the teaching and learning environment has changed significantly due to rapid growth and development in digital tools and resources. In the 21st century, learners have a diverse level of access to technology ranging from not having technology at all to those who have increasing access, and to those who have plenty of access to technology. They all expect to utilize technology in a meaningful manner.

4.1. The Need for Transformational Pedagogy

Today's learning environment and the new skills students need in our knowledge-based economy, demand a shift from Instructional Paradigm to Learning Paradigm. The role of a teacher has changed from the source of knowledge to a guide to the source of knowledge. Focus has changed to learning by doing, experiencing and discovering with a supportive and collaborative environment. In the Learning Paradigm emphasis is more on integration of theory and practice to find solutions to the problems. Learning is not restricted to the classroom and within school but ICT enables extension of learning outside the classroom and wider participation in teaching and learning.

The development of new technologies requires a shift from traditional teacher-directed rote learning to more engaging and collaborative learning. There is a radical shift towards strengthening pedagogy through Information Communication Technology (ICT). The development of technology literacy is key to creating a programme to prepare learners, citizens, and the workforce for the demands of the future and to support social development and improve economic productivity.

ICT tools can broaden learning experiences:

- through learning independently by following personalized learning journeys and interests.
- by adopting simulations of real-world events for creativity and innovation.
- outside the school building for more collaboration and communication with different audiences.

The latest trends of knowledge economy require new skills like creativity, teamwork and collaborative skills, self-reliance, ability to analyse, synthesize, evaluate, and question.

4.2. Learning Techniques

An important factor in learning is using innovating, engaging, and interactive techniques in our classrooms. With the introduction of ICT, teachers can explore new possibilities, such as

Project-Based Learning

Project-Based Learning is a student-centric strategy that reflects the real demands of the digital age and engages young learners effectively. It is a constructivist approach that drives learning by presenting challenging, open-ended problems and enables students to work in collaborative groups to solve problems.

Active Learning

Active Learning is an umbrella term that refers to multiple models of instruction that encourage students to take responsibility for their learning with the teachers just being in the role of a facilitator. To effectively deliver this curriculum, teachers should be encouraged to implement a variety of teaching methods and tools to integrate active learning activities and approaches to keep the students engaged and motivated.

Individualized and Personalized Learning

Individualized and Personalized Learning is a method which tailors the content, learning materials, and media as well as the pace of learning according to individual students' abilities, strengths, and interests.

Chapter 5: ASSESSMENT AND EVALUATION

5.1. Assessment

Assessment and evaluation are the key pillars of a curriculum as the results of these feedback into the teaching and learning process. However, it is intended that the curriculum is focussing more on the learning rather than assessments, examinations, and their results. Assessment and examination should be to support learning rather than defining it.

Continuous Assessment

Throughout the process of the delivery of curriculum, a variety of formal and informal continuous assessments are needed to gauge the level of competence, progress, and achievements of learners. Continuous assessments must be learner-centered, deeply anchored in the curriculum with simple and manageable instructions and goals. The assessment data must be reliable and provide a clear picture of the learners' performance. It should be used to give clear and regular feedback to the learners and their parents and formulate strategies to reflect and improve the teaching and learning process. The learner's progress and achievements in all subjects must be reported regularly to parents via the school report.

Formative and summative assessment

Assessments are considered formative when:

- done continuously before the culmination of a module/term
- used to motivate them to extend their knowledge and skills, establish sound values, and to promote healthy habits of study
- used by the teacher to improve teaching methods and learning materials continuously

Summative assessment is made at the end of the school's academic year or term by accumulating the progress and achievements of the learner throughout the year or term, in the form of any end-of-year tests or examinations. The result of summative assessment is a single end-of-year or term grade.

Formal and informal methods

It is the responsibility of a teacher to assess each learners' performance and achievements in terms of the Student Learning Outcomes to get a clear picture of all-round progress of the learner. Assessments do not have to be done in a formal way every time they are being conducted. A large extent of the assessment data can be gathered in an informal way through structured observations of each learner's interest and progress during class during investigation sessions, applying knowledge and skills to solve problems, communicating and their participation in general.

5.2. Evaluation

Evaluation is the process of analysing, reflecting upon the collected assessment data, and taking appropriate decisions or actions based upon the information gathered. Evaluation is effective when the findings are fed back into the teaching-learning process and carried out regularly and comprehensively through the use of a variety of assessment tools and techniques. Without effective assessment and analysis of the relevant findings, it is not possible to make a judgement on the student's learning and progress, whether the teaching has been effective, and how to cater to students' individual needs.

Criterion-referenced grades

Grades awarded after assessments must reflect the learners' actual level of achievement. The assessments must be criterion-referenced, with a descriptor attached to each grade level. Each grade descriptor and their application to continuous assessment must be known to each department/section so grades can be correctly and consistently awarded across subjects, for the assessment data to be reliable.

Grade Descriptor:

The learner's achievement in the basic competencies in each subject will be shown in letter grades A-F, where A is the highest and F the lowest grade. As far as possible a letter grade should be used directly as the marks. The relation between the letter grades and basic competencies is shown below:

Grades	Marks range	Grade Descriptor
A+	80% & Above	Achieved Basic Competencies exceptionally well. The learner is outstanding in all areas of competency.
A	70% - 79.99%	Achieved Basic Competencies very well. The learner is proficient in most areas of competency.
B	60% – 69.99%	Achieved Basic Competencies well.
C	50% – 59.99%	Achieved Basic Competencies satisfactorily.
D	40 % – 49.99%	Achieved enough Basic Competencies
E	33% – 39.99%	Achieved enough Basic Competencies to exceed the minimum competency level.
F	Less than 33%	Did not achieve the minimum level of competence. The learner needs learning support

5.3. Conducting and recording assessment

Assessments must be planned at the beginning of an academic year and kept as simple and straightforward as possible. Marks for all categories of assessments like quizzes, assignments, tests, and homework etc. must be recorded as soon as the assessment is conducted and marked.

The three assessment objectives for ICT literacy are:

Knowledge with Understanding

Learners should be able to demonstrate knowledge with understanding about computing fundamental in relation to:

1. the range of equipment, tools and techniques used to solve simple problems;
2. the effects of the use of computers;
3. the functions of the main hardware and software components of information processing systems.

(Questions assessing these objectives will often begin with words such as: name, identify, define, state, etc.).

Problem Solving

Learners should be able to:

1. identify problems within the field of information processing limited to basic Word Processing, Spreadsheet and Multimedia Presentation;
2. analyse problems by considering relevant functional and practical factors;
3. select from a range of resources those which are most suitable for performing a given task;
4. implement solutions using equipment and tools sensibly;

(Questions assessing these objectives will often begin with: explain, compare, create, apply, etc.).

Communication

Learners should be able to:

1. organize, interpret and present data to provide useful information;
2. recognize and present information in a variety of forms;
3. communicate in appropriate ways, information about applications of computers, problems and their solutions;

(Questions assessing this objective will often begin with: name, explain/describe the use of ...).

Continuous Assessment: Detailed guidelines

- **Topic Tasks:** The activities teachers use in their day to day teaching are Topic Tasks. These are recorded and assessed activities done at the beginning or during a topic or for revision of a topic.
- **Project:** Project is a student-led activity which gives the students an opportunity to complete an investigation on a topic given in the curriculum. This enables both students and teachers an opportunity to investigate a given topic at a much greater depth. At least two projects must be carried out in a subject per year. The projects are assessed using a rubric.
- **Monthly Assessment:** Topics completed every month should be evaluated with a test indicating the achievements of students in that respective month.
- **End-of-term Assessment:** Performance of a student at the end of a term is evaluated with the help of a comprehensive end-of-term assessment.

End Term Papers will have the following structure:

Sr. #	Type	Percentage
1	Objective Type	40 %
2	Short Questions / Answers	60 %

Division of Marks (Grade VI - VIII)

The academic year is divided into three terms:

- 1st Term – April to September
- 2nd Term – September to December
- Final Term - January to March

Component	1 st Term	2 nd Term
	Marks	Marks
Monthly Assessments	10	10
Project	50	50
End of Term Assessments	40	40
Total	100	100

Component	Final Term	
	Marks	Weightage
1 st Term Marks	Obtained marks	25 %
2 nd Term	Obtained marks	25 %
End of Term Assessments	100	50 %

5.4. Chapter wise Weightage - Theory and Practical Periods

Grade 6	Weightage	Allocation of Periods	
		Theory	Practical
ICT Fundamentals	12%	8	3

System Software	15%	5	10
Application Software	30%	5	25
Problem Solving	20%	5	20
Internet Basics	10%	5	2
ICT- Ethics and Security	8%	7	0
Entrepreneurship in the Digital Age	5%	5	0
Total	100 %	40	60

Grade 7	Weightage	Allocation of Periods	
		Theory	Practical
ICT Fundamentals	12%	12	5
Application Software	30%	5	25
Problem Solving	30%	5	25
Electronic Mail	10%	5	5
Cyber World	13%	8	0
Entrepreneurship in the Digital Age	5%	5	0
Total	100 %	40	60

Grade 8	Weightage	Allocation of Periods	
		Theory	Practical
Computer Networks and Security	17%	12	3

Application Software	30%	5	25
Problem Solving	30%	5	25
Web Applications - Learning Platforms and Social Media	10%	5	5
Cyber Crime Laws	8%	8	2
Entrepreneurship in the Digital Age	5%	5	0
Total	100 %	40	60

Chapter 6: GUIDELINES TO THE TEXTBOOK AUTHORS

Textbooks are another important pillar of the teaching and learning process and one of the most commonly used resources in classrooms. Textbook development is a task of utmost importance because it requires the student learning outcomes to be translated to an appropriate level for cognitive understanding of the students. The following guidelines need to be considered by the textbook authors:

- Introduction to the textbook explaining the structure and format of the book, organization of concepts in connection with the curriculum objectives, and directions to use the textbook must be stated in the beginning of the textbook.
- The textbook must have accurate, authentic, and up-to-date material.
- The language structure should be written in such a way that it is easy to understand by readers.
- The material must be sufficient to give students the knowledge they need to understand, the concepts, develop the inquiry skills and engage in higher order thinking.
- The material should help students understand the world in which they live, and prepare for lifelong learning.
- The material must be error free so that it can be trusted.
- The material must be unbiased.
- The book must be attractive and engaging along with illustrations, tables, graphs etc.
- The illustrations should be clearly, accurately, appropriately and neatly drawn. These must be properly labelled and captioned.
- The textbook should have a variety of practical and thinking activities to engage students in learning.
- Exercises should be included to encourage students to think, develop skills, and use information for a variety of purposes.
- The textbook must contain a Table of contents and Glossary.
- The textbook must be contextually relevant and feasible to use in a normal classroom environment.

- The figures, illustrations and pictures should be from a local/ Pakistani environment.
- The textbook should give students material to think beyond the textbook too.
- Must contain the projects from real-world covering the following tools;
 - Paint 3D
 - Word Processing
 - Spreadsheet
 - Multimedia Presentation and Graphics
 - Scratch
 - Python
- Must contain the rubrics for the assessment and evaluation of projects mentioned above.

6.1 Guidelines for Writing a Chapter

To make the learning of ICT interesting and exciting, to provide a strong foundation for higher learning, each chapter in the ICT textbook must have, among others, the following features.

- **Chapter opener** to introduce the chapter with title, full page coloured photographs, trigger questions and SLOs.
- **Specific Learning Outcomes** at the beginning of each chapter clearly describing the objectives and tasks to be achieved in the chapter.
- **Key words, terms and definitions to be highlighted in the text.**
- **Headings and subheadings** with colour coding to show different levels.
- **ICT titbits** to provide snippets of interesting and useful knowledge.
- **Attractive and colourful illustrations to captivate students.** The figures to be drawn by students should be given as line diagram.
- **Do You Know?** Questions to recall, think and apply what they have learnt as well as to reinforce the learning of key concepts and principles.
- **Everyday experiences** and context which students can relate to be used throughout the book.
- **Hands on activities** to encourage students to make their own inquiries.
- **Skills and processes** to infuse values, ethics and attitudes.
- **IT related activities** to encourage students to use internet resources.

- **Mini-exercise** to provide questions related to ICT contents
- **Awareness beyond the classroom** to widen the horizon of the students by providing interesting information and introducing related, more advanced concepts according to grade level in an understandable way.
- **Key Points** to provide a summary of the concepts and principles at the end of each chapter.
- **Review Questions** at the end of each chapter to
 - Recall and integrate previous learning
 - Engage students and develop their creativity
 - Move from lower to higher order thinking
 - Develop process skills
 - Develop multiple intelligences
- **Think-Tank/Investigate** to include open-ended questions to provoke students' thinking, creativity and investigation skills.

6.2 Criteria for Analysis of the Textbook

Following criteria must be considered for selecting learning material for the textbook. Answers to most of these questions, if in the affirmative, will indicate a good quality textbook.

1. Is the content accurate and up to date?
2. Are important skills developed?
3. Do the illustrations (pictures, drawings, graphs, etc.) help to understand the contents better?
4. Do the end-of-chapter activities/exercises encourage students:
 - a. to think?
 - b. to develop their skills?
 - c. to be creative?
5. Are learning activities suitable for the needs of the learner?
6. Do learning activities include student participation in real life issues and promote digital inquiry or investigation?
7. Is a variety of assessment strategies suggested? (e.g., multiple choice, project work, exhibitions, open-ended and divergent responses, think tank etc.)

8. Do the text, questions and suggested activities stimulate interest that would lead to further study?
9. Are the contents bias free?
 - a. Religion
 - b. Nationality
 - c. Gender
 - d. Occupation
 - e. Social Class
10. Is it related to the goals of the curriculum?
11. Is a teacher's guide included?
12. Is it attractive and appealing to children?
13. Is the language readable, understandable, and easy to follow? Is it appropriate for the children who will use it?
14. Are the following adequate?
 - a. Paper quality (80gm, white)
 - b. Picture quality (Resolution and colours)
 - c. Page size 23x36/8
 - d. Line spacing 1.25
 - e. Titles and sub-titles 28-32, 18-22
 - f. Font size 14 Arial
15. Are the contents relevant to the needs, age and level of understanding of the students?
16. Is there an introduction and key points/summary?
17. Does it have:
 - a. An introduction? (How to use book)
 - b. Table of contents?
 - c. Glossary?

6.3 Teacher's Guide

Teacher's guide provides detailed explanations of key concepts. Textbooks usually come with a teacher's guide aimed at informing teachers of how the textbook is written and how it is best to use it to facilitate student learning. It is a way to teach a particular topic,

provide further activities, web links, examples, answers to think- tank questions and text related questions.

Annexure 1: STANDARDS FOR COMPUTER LAB
Standards - ICT Lab

Requirements	Client – Server
No. of Nodes	25 - 30
Design	U Shape with horizontal line
Keyboard & Mouse (USB)	Yes
Tray for Keyboard / Mouse	No
Space per User / Node	3 ft. (width) 2 ft. (length)
Workstation for Computer Teacher with computers	Yes
Chairs	50
Whiteboard	Yes
Technology Deployment	<p>Minimum Computer Specifications - Client Processor - Core i7 2.4 GHz+ or equivalent AMD RAM - 16 GB Hard Drive - 500 GB or larger solid-state hard drive Graphics Card - any with Display Port/HDMI or DVI support - desktop only Wireless card - 802.11ac (WPA2 support required) Monitor -18.5" widescreen LCD/LED with DisplayPort/HDMI or DVI support - desktop only Speakers or Headset Operating System - Windows 10 Home or Professional editions</p>
Multimedia Projector	Fixed
Interactive Whiteboard with educational content – EyeRis IX and Above	Yes
Lab Speakers	Yes (with Microphone)
Rostrum	Yes
AC (2 or 3 as per room size)	Yes
Centralized Backup for Server and clients (UPS/Solar Panels)	Yes
Network cabling	Yes
Wi Fi Access	Yes
Printer	Yes
Scanner	Yes
External DVD RW	Yes
External USB (500GB)	Yes
IP camera for monitoring	Yes

Annexure 2: LIST OF SOFTWARE, TOOLS AND RESOURCES**Category: ICT Software**

Name of Resource	Link	Grade level	Pricing
Windows 10 Home/Professional Edition	https://www.microsoft.com/en-us/software-download/windows10	all	Paid
Office 2016	https://products.office.com/en/professional	all	Free for Educational Institutions
Paint 3D	https://www.microsoft.com/en-us/store/p/paint-3d/9nblggh5fv99	VI	Available in Windows 10
Windows Movie Maker	https://www.microsoft.com/en-us/p/movie-maker-10-free/9mvfq4lmz6c9	VIII	Available in Windows 10
Adobe Photoshop	https://www.adobe.com/products/photoshop.html	VIII	Paid
Rapid Typing Tutor	http://www.rapidtyping.com/downloads.html	VI	Free
PhET Simulation	https://phet.colorado.edu/	VII	Free
GeoGebra	https://www.geogebra.org/download	VII	Free
Scratch	https://scratch.mit.edu/download	VI - VII	Free
Educational Portal	https://www.khanacademy.org/	VIII	Free
MOOCs	EdX, Coursera, FutureLearn, Udemy, Moocs.com	VIII	Free and Paid
Python IDLE	https://www.python.org/downloads/	VIII	Free
Python Turtle Graphics Library	http://pythonturtle.org/	VIII	Free

Category: Assessment

Name of Resource	Link	Grade level	Pricing
Kahoot	https://kahoot.com/welcomeback/	all	Free
Quizalize	https://www.quizalize.com/	all	Free
Quizlet.com	https://quizlet.com/	all	Free and paid
Word Smyth	https://www.wordsmyth.net/	All	Free
Quizizz	https://quizizz.com/	All	Free
Socrative	https://www.socrative.com/	All	Free and paid
Go Formative	https://goformative.com/	All	Free
wizer.me	http://app.wizer.me/	All	Free and paid
Book Creator	bookcreator.com	All	Free and paid
Prodigy	https://www.prodigygame.com/	1-8	Free and Paid
Plickers	https://www.plickers.com/	All	Free
Desmos	https://teacher.desmos.com/	5-12	Free

Category: Blogging

Name of Resource	Link	Grade level	Pricing
Glogster	http://edu.glogster.com/	2nd & up	7 day trial Range \$30-\$90
Blogger	http://www.blogger.com	all	Free
Padlet	www.padlet.com	all	Free
Flipgrid (video blogging)	Flipgrid.com	All	Trial period for advanced features and free with limited access to advanced features

Category: Instructional Delivery

Name of Resource	Link	Grade level	Pricing
Nearpod	https://nearpod.com/	teacher	Free for teachers
Ed Puzzle	https://edpuzzle.com/	teacher	Free
Spiral	https://spiral.ac	teacher	Most features free
ThingLink - annotate images and video	https://www.thinglink.com/	All	Free plus further options
Prezi	https://prezi.com/	All	Free plus further options
Notability	http://gingerlabs.com Allows you to annotate and do 1000s other things. iPad App / iOS	All	Free and paid versions
Readworks.	https://www.readworks.org/	teacher	Free
Tweentribune	https://www.tweentribune.com/ articles with varied lexiles	teacher	Free

Category: Polling/Responsive

Name of Resource	Link	Grade level	Pricing
Google Forms		all	free
Plickers is a powerful simple tool that lets teachers collect real-time formative assessment data without the need for student devices	https://www.plickers.com/	All	Free

Category: Study Practice

Name of Resource	Link	Grade level	Pricing
Quizlet	https://quizlet.com/latest	K & up	Student version FREE Teacher version \$3/ month
DeckToys	https://deck.toys	K -12	Free for most components, \$96 a year for Pro Version
Quizizz	https://quizizz.com/admin	All	Free
Socrative	http://www.socrative.com	K-12	Free and Paid
Norredink	https://www.noredink.com/	All	Free and paid
Prodigy	https://www.prodigygame.com/	1-8	Free and Paid
Study Stack	https://www.studystack.com	All	Free

Category: Lesson Building/Making

Name of Resource	Link	Grade level	Pricing
Easy-to-use Online Vocabulary/ Game maker	http://englishteaching101.com/online-vocabulary-games-generator/	All	range
Tes Teach	https://www.tes.com/lessons	Teachers	Free

Category: Website Creation (which supports video)

Name of Resource	Link	Grade level	Pricing
Google Sites	http://sites.google.com	K-12	Free
Weebly	www.weebly.com	all	Free for most things

Category: Video Creation

Name of Resource	Link	Grade level	Pricing
<p>Screencast-o-matic Great for recording flipped lessons. Create very small file sizes that can be uploaded</p>	www.Screencast-o-matic.com	6-12	<p>Free version w/o editing, has watermark Paid: \$18/year includes editing and no watermark</p>
Adobe Spark	www.spark.adobe.com	6-12	Free
Screencastify	Available in chrome webstore	3-12	Free version
Educreations	https://www.educreations.com/	All	Free and paid
Flipgrid	www.flipgrid.com	All	Trial period for advanced features and free with limited access to advanced features
We Video	https://www.wevideo.com/	All	Free and paid

CURRICULUM REVIEW COMMITTEE

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4	Ms. Sadaf Zehra Kazmi Assistant Professor	Islamabad Model College for Girls (Post Graduate), F-7/2, Islamabad
5	Ms. Sadaf Rasheed Assistant Professor	Islamabad Model College of Commerce for Girls, F-10/3, Islamabad
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11	Mr. Asad Sardar Desk Officer	National Curriculum Council Secretariat