

**MATRIC TECH CURRICULUM**  
**OF**  
**COMPUTER SCIENCE**  
**GRADE IX-X**  
**FOR HEARING IMPAIRED STUDENTS**  
**2023**



**GOVERNMENT OF PAKISTAN**  
**Ministry of Federal Education and Professional Training**  
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## Introduction

The art, profession, and academic field of computer science involves the projection of visual communications with the aim of delivering specific messages to social groups with specified goals. As a result, it is an interdisciplinary area of design whose foundations and goals focus on problem characterization and setting choice objectives through innovation, creativity, and lateral thinking while applying digital tools to change them for correct understanding. The enhancement of enhance skills is aided by these activities.

Information technology has opened new avenues that enable unprecedented access to vast bodies of knowledge and possibilities of collaboration among researchers and scientists. To safeguard entitlement in this important sphere our children need to be exposed to information and communication technology at an early stage.

The National Scheme of Studies notified in 2022 includes the National Curriculum of Computer Science with the following provisions:

“Compulsory subject for Computer Science Group of SSC with two hundred marks (40 for theory and 160 for Practical), 2 periods a week including 6 periods for practical”.

The intent of the curriculum is to prepare students for achieving the following goals:

- Computer and Information Literacy
- Productivity through Technology
- Computer Hardware and Software
- Communication and Computer Networks Literacy
- Algorithmic Thinking and Problem-Solving

- Operating Systems
- System Development

Theory and practical are combined into a learning experience through the curriculum's design. It will give the students the fundamentals of information and computer literacy. They will pick up useful computing skills and build algorithmic thinking into their everyday problem-solving lexicon. The students will have access to a variety of formats of information from electronic resources.

## **Rationale**

Well-designed pieces of graphic design enable its creators to boost up sales, establishing its name and earning goodwill in the market, and thereby maximizing the profitable base of the business. A well-crafted design of graphics seeks to attract the attention of a large number of people. Without a useful design the company may not be able to highlight its product and increase its customer base on the site, which affects the business and profitability of the company.

## **Aims**

- Make the learner skilled enough to fulfill the industry requirement
- Give the learners enough knowledge, skills, and attitude courage to startup their own business
- Develop skills to promote personal business and entrepreneurship

## **Objectives**

- Familiarize the students with basic principles and fundamentals of Computer.
- Able to create effective and innovative designs to convey desired ideas.
- Develop basics skills using tools and theory using System.
- Understand creative process to develop techniques and methods of problem solving.

## CURRICULUM COMPUTER SCIENCE GRADE-IX

<b>Chapter 1: Computer Fundamentals</b>				
<b>Contents</b>	<b>Student Learning Outcomes(SLOs)</b>	<b>Activities/Practical</b>	<b>Tools/ Equipments</b>	<b>Workplace</b>
Basic Concepts of Computer	The student will be able to: <ul style="list-style-type: none"> <li>● Define computer.</li> <li>● Understand the importance of computers.</li> <li>● Know about the components of computer and their applications.</li> <li>● Describe usage of computer.</li> </ul>	<ul style="list-style-type: none"> <li>● Recognition of Hardware Components.</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories</li> <li>● Operating System</li> <li>● Office Software</li> </ul>	Computer Lab
Fundamentals of Operating System	<ul style="list-style-type: none"> <li>● Define Operating System and its types (Apple macOS, Microsoft Windows, Google's Android OS, Linux Operating System, and Apple iOS).</li> <li>● Understand the objectives of Operating System.</li> <li>● Know about the basic Icons of Operating System.</li> <li>● Understand the major functions of Operating System.</li> <li>● Working with files and folders (copy, move, delete, recycle bin, personalize desktop etc).</li> <li>● Install any Operating System on a system.</li> </ul>	<ul style="list-style-type: none"> <li>● Identify the Operating System.</li> <li>● Create, Copy and Move files and folders.</li> <li>● Delete and Restore the file and folder from Recycle Bin.</li> </ul>	<ul style="list-style-type: none"> <li>● Computers having Microsoft Windows, Linux, Google's Android OS, mac OS and its accessories like MS Office etc.</li> </ul>	Computer Lab

## Chapter 2: Computer Hardware

Contents	Student Learning Outcomes(SLOs)	Activities/Practical	Tools/ Equipments	Workplace
Introduction & Identification of Basic Hardware	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>● Know about Central Processing Unit (CPU).</li> <li>● Understand the importance of Memory.</li> <li>● Understand the use of RAM and ROM.</li> </ul>	<ul style="list-style-type: none"> <li>● Locate the CPU on Motherboard.</li> <li>● Locate the RAM on Motherboard.</li> <li>● Locate the ROM on Motherboard.</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories.</li> </ul>	Computer Lab
Input/ Output Devices	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>● Know about Input/ Output devices.</li> <li>● Know about the use of correct Input/Output device according to need.</li> </ul>	<ul style="list-style-type: none"> <li>● Identify Input/Output devices.</li> </ul>	<ul style="list-style-type: none"> <li>● Mouse</li> <li>● Keyboard</li> <li>● Scanners</li> <li>● Cameras</li> <li>● Joysticks</li> <li>● Microphones</li> <li>● Printers</li> <li>● Monitors</li> <li>● Headphone</li> </ul>	Computer Lab
Expansion Slots	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>● Know about AGP, PCI and IDE.</li> <li>● Know about SATA Interface &amp; Cable and their usage.</li> <li>● Know about Memory Slot and its usage.</li> </ul>	<ul style="list-style-type: none"> <li>● Identify Expansion Slots from the Motherboard.</li> </ul>	<ul style="list-style-type: none"> <li>● Motherboard</li> </ul>	Computer Lab
Ports and their types	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>● Know about the functions of                             <ul style="list-style-type: none"> <li>○ Serial Port</li> <li>○ Parallel Port</li> <li>○ PS/2 Port</li> <li>○ USB Port</li> <li>○ HDMI Port</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Identify Ports from the system unit.</li> </ul>	<ul style="list-style-type: none"> <li>● Motherboard</li> </ul>	Computer Lab
Types of Expansion Cards	<p>The student will be able to:</p> <ul style="list-style-type: none"> <li>● Know about the functions of                             <ul style="list-style-type: none"> <li>○ Sound Card</li> <li>○ Video Graphic Card</li> <li>○ Modem Card</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Identify Expansion Cards on Motherboard.</li> </ul>	<ul style="list-style-type: none"> <li>● Sound Card</li> <li>● Video Graphic Card</li> <li>● Modem Card</li> </ul>	Computer Lab

	<ul style="list-style-type: none"> <li>○ Network Interface Card</li> <li>○ Wireless Network Card</li> <li>● Understand the importance of SSD Card &amp; SSD HDD</li> </ul>		<ul style="list-style-type: none"> <li>● Network Interface Card</li> <li>● Wireless Network Card</li> <li>● SSD Card</li> <li>● SSD HDD</li> </ul>	
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Chapter 3: Operating System				
Contents	Student Learning Outcomes	Activities/Practical	Tools/ Equipments	Workplace
Introduction of Operating System	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>● Define Operating System.</li> <li>● Know about the functions of Operating System.</li> <li>● Know about the types of Operating system like: -               <ul style="list-style-type: none"> <li>a) Windows</li> <li>b) Linux</li> </ul> </li> <li>● Understand the functions of basic icons of Operating System.</li> </ul>	<ul style="list-style-type: none"> <li>● Classify the type of given software.</li> <li>● Identifying different components of specific operating system.</li> <li>● Differentiate the several types of operating systems.</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories, office software</li> <li>● Windows</li> <li>● Linux</li> </ul>	Computer Lab
Operating System Installation	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>● Understand the installation of OS windows.</li> <li>● Describe different steps of installation process.</li> <li>● Know about Boot from storage media (DVD, Mass storage, external hard disk etc.)</li> <li>● Understand the Partitioning and formatting of SSD/HDD process.</li> <li>● Know about the selection of appropriate drive.</li> </ul>	<ul style="list-style-type: none"> <li>● Classify the type of given software.</li> <li>● Demonstrate the booting process from different internal or external storage media.</li> <li>● Install device drivers.</li> </ul>	<ul style="list-style-type: none"> <li>● White board</li> <li>● Multimedia</li> <li>● Internet</li> <li>● Computer system</li> </ul>	Computer Lab

	<ul style="list-style-type: none"> <li>● Understand the Installation process of device drivers.</li> </ul>			
Operating System Usage	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>● Know about copying, moving, renaming files and folders.</li> <li>● Know about searching files and folders.</li> <li>● Use Personalize Desktop settings.</li> <li>● Use Personalize display settings.</li> <li>● Know about files extension.</li> <li>● Know about Hide / Unhide files / folders / System files.</li> <li>● Use Device Manager.</li> <li>● Use Task Manager.</li> <li>● Use the command prompt.</li> </ul>	<ul style="list-style-type: none"> <li>● Create new directory according to given properties</li> <li>● Install device driver of printer</li> <li>● Create, copy, move, and rename files.</li> <li>● use command prompt for opening files and folders.</li> <li>● Install application software on window.</li> </ul>	<ul style="list-style-type: none"> <li>● White Board</li> <li>● Multimedia</li> <li>● Internet</li> <li>● Computer system</li> </ul>	Computer Lab
Updating and Upgrading OS	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>● Understand the difference between updating and upgrading the Operating System.</li> <li>● Understand the process of updating the OS.</li> <li>● Know about the free space of Hard Drive.</li> <li>● Know about checking available OS updates online.</li> <li>● Know about the Booting from storage media (DVD, Mass storage, external hard disk etc.) or internet.</li> </ul>	<ul style="list-style-type: none"> <li>● Update Operating System.</li> <li>● Upgrade Operating System.</li> </ul>	<ul style="list-style-type: none"> <li>● White board</li> <li>● Multimedia</li> <li>● Internet</li> <li>● Computer system</li> </ul>	Computer Lab

	<ul style="list-style-type: none"> <li>• Know about the Selection of appropriate drive.</li> </ul>			
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Chapter 4: Computer Applications (Part-I)				
Contents	Student Learning Outcomes	Activities/Practical	Tools/ Equipments	Workplace
Application Basic	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>• Know about the basic interface of Computer application like: -               <ul style="list-style-type: none"> <li>○ Use Menus.</li> <li>○ Use Toolbars</li> <li>○ Filling Out a Dialog Box</li> <li>○ Using Undo</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Identify Tabs in Toolbars</li> </ul>	<ul style="list-style-type: none"> <li>• Computer and its accessories</li> <li>• MS office software</li> </ul>	Computer Lab
MS Office	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>• Define MS Office.</li> <li>• Describe applications of MS Office (Word, PowerPoint &amp; Excel).</li> <li>• Know about working in MS word.</li> <li>• Use MS Word in daily life.</li> <li>• Know about working in PowerPoint.</li> <li>• Use MS PowerPoint in daily life.</li> <li>• Know about working in MS Excel.</li> <li>• Use MS Excel in daily life.</li> </ul>	<ul style="list-style-type: none"> <li>• Use Ms Office</li> </ul>	<ul style="list-style-type: none"> <li>• Computer and its accessories</li> <li>• MS office software</li> </ul>	Computer Lab

<p>Microsoft Word</p>	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>● Know about MS word</li> <li>● Know about the use of font size and style.</li> <li>● Use formatting paragraphs.</li> <li>● Use inserting and editing text applications.</li> <li>● Understand the use of minimize /maximize ribbon.</li> <li>● Know about Inserting symbols.</li> <li>● Know about Inserting Page Breaks and Section Breaks.</li> <li>● Insert Header, Footer, and Page Number.</li> <li>● Insert Picture.</li> <li>● Insert WordArt.</li> <li>● Know about Creating and Formatting Table.</li> <li>● Understand the usage of Changing Margins</li> <li>● Use Hyperlink.</li> <li>● Insert watermarks.</li> <li>● Manage a Document</li> </ul>	<ul style="list-style-type: none"> <li>● Prepare document on MS word using its tools</li> <li>● Use application of MS Word.</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories</li> <li>● MS office software</li> </ul>	<p>Computer Lab</p>
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## CURRICULUM COMPUTER SCIENCE GRADE-X

Chapter 1: Computer Applications (Part II)				
Contents	Student Learning Outcomes	Activities/Practical	Tools/ Equipments	Workplace
Power Point	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>● Know about Elements of Slide &amp; Slide Layout</li> <li>● Know about the functions of                             <ul style="list-style-type: none"> <li>○ Clip Art</li> <li>○ Graphs</li> <li>○ Tables</li> <li>○ Photographs</li> <li>○ Charts</li> <li>○ Media Clips</li> <li>○ insert Videos in slides</li> <li>○ ClipArt, Video, Audio, etc.</li> <li>○ Slide Design</li> <li>○ Animations</li> <li>○ Slide Transitions</li> <li>○ Background Image</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Prepare presentation on components of computer by using power point.</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories</li> <li>● MS office software</li> </ul>	Computer Lab
Ms Excel	<p>The students will be able to understand:</p> <ul style="list-style-type: none"> <li>● Know about MS Excel.</li> <li>● Know about the functions of :-                             <ul style="list-style-type: none"> <li>○ Ribbon</li> <li>○ Rows, Columns, Sheets and Workshop</li> <li>○ Basic Formulas and Functions</li> <li>○ Charts and Graphs</li> <li>○ Shortcut Keys</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Preparing result Card</li> <li>● Prepare an excel sheet on class data</li> <li>● (Student, Furniture, Number of computers)</li> <li>● Converting data into graphical format</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories</li> <li>● MS office software</li> </ul>	Computer Lab

Introduction to InPage	The student will be able to: <ul style="list-style-type: none"> <li>● Define InPage.</li> <li>● Understand the purpose of InPage.</li> <li>● Define Home Screen.</li> <li>● Know about the functions of <ul style="list-style-type: none"> <li>○ Menu bar,</li> <li>○ Property bar,</li> <li>○ Status bar.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Create a page with default setting.</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories</li> <li>● InPage</li> </ul>	Computer Lab
Basic Concepts of InPage	The student will be able to: <ul style="list-style-type: none"> <li>● Use of Nastalik true type font.</li> <li>● Use of Arabic and decorative font.</li> <li>● Know font sizes &amp; text alignments.</li> <li>● Understand mixing Urdu, Arabic and English in the same document.</li> <li>● Understand the use of import &amp; exports for different file extensions.</li> </ul>	<ul style="list-style-type: none"> <li>● Write an application to the Principal for sick leave in Urdu.</li> <li>● Prepare a document having tables, bullets, images, columns, etc. as per requirement.</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories</li> <li>● InPage</li> </ul>	Computer Lab

Chapter 2: HTML				
Contents	Student Learning Outcomes	Activities/Practical	Tools/ Equipments	Workplace
HTML	The student will be able to: <ul style="list-style-type: none"> <li>● Know about HTML</li> <li>● Understand the functions of : <ul style="list-style-type: none"> <li>○ Web Page</li> <li>○ Web Site</li> <li>○ Browser</li> <li>○ Web Server</li> <li>○ URL</li> <li>○ Search Engine</li> <li>○ Home Page</li> <li>○ Web Hosting</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Open any website on the internet and identify its parts.</li> <li>● Search any topic using search engine</li> <li>● Create basic HTML documents.</li> </ul>	<ul style="list-style-type: none"> <li>● White board</li> <li>● Multimedia</li> <li>● Internet</li> <li>● Computer system</li> </ul>	Computer Lab

	<ul style="list-style-type: none"><li>○ Hyper Markup Language (HTML)</li><li>○ Text Formatting in HTML Document</li><li>○ Page title</li><li>○ Create Paragraph</li><li>○ Insert line breaks</li><li>○ Adding heading/sub/heading</li><li>○ Font Size</li><li>○ Font Color</li><li>○ Font Face</li><li>○ Bold Text</li><li>○ Italic Text</li><li>○ Subscript Text</li><li>○ Super Subscript Text</li><li>○ Underline Text</li><li>○ List in HTML</li><li>○ Images and Background in HTML</li><li>○ Hyperlinks in HTML</li></ul>			
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### Chapter 3: Computer Networks

Contents	Student Learning Outcomes	Activities/Practical	Tools/ Equipments	Workplace
Introduction to Computer Networks	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>● Define computer networks.</li> <li>● Know about the basic Network components (Sender, Receiver, Medium)</li> <li>● Understand the modes of Communications (Simplex, Half Duplex, Full Duplex).</li> <li>● Understand of Communication Media (Guided, Un-Guided).</li> <li>● Know about Communication devices (Switch, Router and Gateway).</li> <li>● Understand the use of (Client/Server, Peer to Peer)</li> <li>● Understand the use of Network types (LAN, MAN, WAN, VPN)</li> <li>● Understand the use of Topologies (Star, Ring, Bus, Mesh).</li> </ul>	<ul style="list-style-type: none"> <li>● Recognition of basic network devices.</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories,</li> <li>● Switches</li> <li>● Hub.</li> <li>● Switch.</li> <li>● Router.</li> <li>● Bridge.</li> <li>● Gateway.</li> <li>● Modem.</li> <li>● Repeater.</li> <li>● Access Point.</li> </ul>	Computer Lab
Communication Cables	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>● Know about the functions of :                             <ul style="list-style-type: none"> <li>○ Coaxial cable</li> <li>○ Shielded twisted pair cable</li> <li>○ Un-Shielded twisted pair cable</li> <li>○ Ethernet Cable</li> <li>○ Fiber Optics</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Recognition of communication Components.</li> </ul>	<ul style="list-style-type: none"> <li>● Computer and its accessories</li> <li>● Switches</li> <li>● Hub.</li> <li>● Switch.</li> <li>● Router.</li> <li>● Bridge.</li> <li>● Gateway.</li> <li>● Modem.</li> <li>● Repeater.</li> <li>● Access Point.</li> <li>● Communication cables</li> </ul>	

### Chapter 4: Wireless Communications

Contents	Student Learning Outcomes	Activities/Practical	Tools/ Equipments	Workplace
Introduction to Wireless Communication	<p>The students will be able to:</p> <ul style="list-style-type: none"> <li>● Define wireless communication.</li> <li>● Understand the advantages and disadvantages of wireless communication.</li> <li>● Understand the concept of Networking.</li> </ul>	<ul style="list-style-type: none"> <li>● Recognition of basic network devices.</li> </ul>	<ul style="list-style-type: none"> <li>● Wireless Communication accessories</li> </ul>	Computer Lab
Short Distance Wireless Communication	<ul style="list-style-type: none"> <li>● Know about the functions of               <ul style="list-style-type: none"> <li>○ Wi-Fi.</li> <li>○ Wi-Max.</li> <li>○ Bluetooth.</li> <li>○ Infra-Red.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Recognition of devices having features of (WIFI, Wi-Max, Bluetooth, Infra-red).</li> </ul>	<ul style="list-style-type: none"> <li>● Devices having such features</li> </ul>	Computer Lab

## Assessment and Evaluation

The technical subject curriculum for Computer Science emphasizes a LAB environment in which students will be encouraged to learn technical processes and knowledge of Computer within meaningful contexts. It is important that assessment strategies reflect this emphasis and are consistent in approach. An assessment program, which provides regular feedback, and is part of the learning process, is important to both student and teacher. Feedback tells students if they demonstrate understanding of concepts and if their actions display expected performance levels for inquiry, decision making, and problem solving. Regular feedback inspires confidence in learning Computer Science and becoming technically literate.

Therefore, the assessment of students' learning must be aligned with curriculum outcomes. The curriculum provides suggestions for developing student learning across the general curriculum outcome areas: knowledge, skill, and attitude. These outcomes describe a balance of inquiry problem solving, and decision making, within a suggested social-environmental context, for a given set of technical knowledge.

### Incorporating assessment into the learning process

Assessment of students' learning must be part of every teaching and learning experience. Students should learn to evaluate their own learning. Traditional student testing programs, which rely on final, one-time evaluations, provide data that is of limited use to students as they construct knowledge. Meaningful assessment, like meaningful learning, must be authentic and connected to real-life problems.

A constructivist approach to learning and teaching has profound implications for the way learning is measured. Traditional classroom practice relies heavily on paper-and-pencil tests to measure students' learning and ability to apply knowledge. Learning is a processor connecting prior understanding with new learning. Consequently, an assessment strategy that measures the acquisition of facts and elements cannot serve a constructivist model.

To allow students to construct learning in the classroom through authentic experiences, assessment must be:

- Valid, leading to attainment of multi-dimensional technical learning
- Open-ended, allowing for discussion and revision of new understanding
- Tolerant of divergent thinking and promote the notion of no "one right answer"
- Presented in alternative modes, not just paper-and-pencil responses to limiting questions
- Designed to promote analysis, comparison, generalization, prediction, and modification
- Capable of promoting collaboration and team effort in demonstration of competence; and ongoing and cumulative, showing development over time.

### Types of assessment

Assessment serves many important purposes. Some of them are given below:

- Diagnostic (to plan instruction to fit the student's prior knowledge)
- Formative (to improve performance and adapt instruction)
- Summative (to report on final performance)

### Classroom Assessment

The primary purpose of classroom assessment is not only to evaluate and classify students' performance but also to inform of teaching methods and learning environment, and to monitor student progress in achieving year-end learning outcomes. Therefore, classroom assessment is used for various purposes:

- Assessment as Learning

- Assessment for Learning
- Assessment of Learning

Traditionally, the focus of classroom assessment has been on assessment of learning (summative assessment). Assessment for learning has been used only for diagnostic processes and for feedback. To enhance the learning of all students, the role of assessment as learning must provide an opportunity to students whereby, they become critical and analysts of their own learning.

### Assessment Strategies

Teachers learn about students' progress not only through formal tests, examinations, and projects, but also through moment-by-moment observation of students. To assess students' knowledge, skills, competencies and attitudes, teachers require a variety of tools and approaches, such as:

- **Selected Response:** Multiple-choice, matching, completion tests, etc.
- **Self-constructed Response Questions:** Fill-in-the-blank phrase(s), essay (restricted and extended response), reports, procedures, explanations, short answer sentence(s), paragraph(s), label diagram, and graph/table, etc.
- **Performance and Activity Based Assessment:** Portfolios, presentation, illustrations, lab, workshops, workstations, field visits, demonstration, process skills, enactment, project, group discussion, exhibition, table, graph, portfolios, etc.

Note: Rubrics for all assessment tools must be prepared before administration.

- **Communication, Attitudes and Values Assessment:** Oral questioning, observation, interview, conference, process description, checklists, rating scales, anecdotal records etc.

### Students' Self-Assessment

Students recognize the relationship between content achievement, skill proficiency, and assessment opportunities by setting their sights on their own demonstration. They can do self-assessment if they are provided with knowledge-related checklists as well as checklists specific to applications and attitudes. Students assume the role of a researcher and use critical thinking skills as they find facts and make inferences to reach more conclusions about their learning. They are not receiving information passively and then simply giving it back to the teacher after memorizing it. Assessment should allow students to monitor their progress in various technical skills: initiating and planning; performing and recording; analyzing and interpreting; communication and teamwork. The curriculum calls for students to be actively involved in their learning, using the tools of dress making during classroom, laboratory, and workshop activities.

### Quality in Assessment

Assessment of professional and vocational learning must change as technical instruction moves from a focus on facts to a focus on in-depth understanding of major concepts and processes. Whereas the Quality Assessment will have the following major objectives:

- Measurement of what students should know and are able to do according to the Learning Outcomes
- Objective verification of the application of technical principles to familiar and unfamiliar situations; and
- Alignment with the Learning Outcomes and the Teaching/Learning Strategies.

Therefore, assessment and evaluation of the students' learning of technical aspects according to predetermined objectives and learning outcomes will ensure the quality of their academic achievements.

### Construction of Test Items

Written test items (selected response and creative response) should adhere to the following criteria:

- Items should be clearly written according to domain and depth of concept.
- Each test item should be written on the understanding level of learners.
- Test items should cover what learners have had opportunities to learn.

Too frequently, these test items measure students' gains in recall of information. There are other relevant facts for students to acquire. These are higher levels of thinking and competency that students should also develop.

These test items should measure students' achievement in:

- Understanding basic technical education concepts of graphic designing and acquired learning.
- Evaluating contents in terms of criteria or learning outcomes
- Problem-solving skills
- Analytical and creative thinking
- Positive attitudes developed toward methods of thinking
- Ability to work together with others
- Relevant concepts and generalizations developed
- Ability to manipulate and utilize techniques and technical equipment
- Understanding the concepts of design development
- Developing the software commands

## **Guidelines for Writing a Textbook**

A textbook is an important teaching and learning resource and one of the most extensively used resources in classrooms. To reflect national needs and aspirations, the needs and aspirations, the textbooks should be written in accordance with this curriculum. This curriculum meets not only the general aims and objectives but also fulfills the specific requirements of the individual subject. As the textbook serves as a framework for teaching, the author/authors should consider the following features:

- A textbook must include an introduction to the textbook, explaining how to use the textbook
- The textbook must be in line with the national curriculum, covering all SLOs of each content.
- Content and illustrations must be culturally, contextually and age appropriate.
- All text and material must be accurate, up-to-date, and error-free.
- The continuity of the concepts, their integration and logical development should be ensured.
- Horizontal and vertical overlapping of the concepts should be avoided.
- The textbook should be informative and interactive with questions to be put at suitable intervals to provoke the students to think.
- The language used should be simple, clear, straight forward, unambiguous, and easily comprehensible by the students of the level.
- Simple questions may be asked within the chapter, which requires students to recall, think, and apply what they have just learnt as well as to reinforce the learning of the concepts and principles.
- The examples and applications should be from everyday life and be supportive of our cultural values.
- Photographs and illustrations should be clear, labeled, and supportive of the text. Tables, flow charts and graphs may be given wherever needed.
- Key points at the end of each chapter should provide a summary of the important concepts and principles discussed in the chapter.
- End-of-the-chapter exercises must include a variety of assessment styles based on levels of Bloom's Taxonomy. These should encourage students to think, develop skills, and use information for a variety of purposes.
- Textbooks should be free from all kinds of biases including gender, religion, occupation, social background etc.
- To make the students self-learner use of IT based resources may be encouraged. Relevant internet links and other online resources may be included.
- A glossary of the new vocabulary must be included.

### **Guideline for Planning and Writing a Chapter**

The textbook author may decide the titles of each chapter and can choose to cover students' learning outcomes (SLOs) from any themes in developing the content of the chapter. The textbook author must also keep in mind that a number of SLOs cannot be addressed in the text (as if this is done it would lead students to simply memorize the text and not serve the realization of the curriculum). These SLOs could be realized through questions and practical activities within and at the end of the chapter exercises.

- Learning outcomes must be given at the beginning of each chapter.
- Decide on key ideas, facts, concepts, skills, and values that can be developed.
- Illustrations must clearly convey the desired concept.
- Activities must demand from students to do inquiry and problem solving according to grade level.
- Ensure that the content is up to date, accurate and developmentally appropriate.
- Contents must be in line with chapter outcomes.
- Language must be consistent, culturally appropriate, and grammatically correct (as if talking to a group).
- Language must engage and hold reader's attention.
- Recall previous learning, where possible.
- Structure the writing so that the sentence is simple, paragraphs deal with single ideas etc.
- Interesting information in the form of tidbits, fact files, points to ponder etc. must be given.
- Write a summary/concept map at end of each chapter, reviewing key knowledge and skills.
- End-of-chapter exercises
- Recall and integrate previous learning
- Engage students and develop their creativity
- Move from lower to higher order thinking
- Focus on multiple intelligences
- Keep the text contextually relevant in line with local teaching and learning.
- Provide website links for further research

### Guidelines for Writing Learner Workbook

Workbooks are books that contain writing activities and exercises that are built upon each chapter in the textbook. Workbook exercises help students to develop conceptual understanding of the concepts dealt with in the text, to develop skills and to apply knowledge to new situations. Basic features of a workbook A workbook should have:

- Various exercises and activities for each chapter, topic, subtopic.
- Exercises and activities that will enable students to develop and practice content knowledge, skills, and higher order thinking.
- Accurate and variety of exercises.
- Clear illustrations/ examples/ explanations to show what students are supposed to do, and/or what product looks like.
- Exercises and activities with a variety of purposeful, stimulating, challenging and innovative items to encourage students to review and practice the knowledge and skills they have learnt.
- Exercises that include both constructed and restricted response items.
- Activities, which require readily available, acceptable, and affordable materials and resources.

## Basic Requirements for Lab (Tools/Equipment)

S. No.	Items
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1.	Computer System
2.	Internet Connection
3.	Web Browser
4.	Search Engines
5.	Internet or Intranet Connectivity
6.	UPS
7.	Operating System (Windows, Linux)

<b>Curriculum Development, Review, and Validation Committee</b>			
<b>Sr. No</b>	<b>Name</b>	<b>Designation</b>	<b>Organization</b>
1.	Dr. Muhammad Idrees	Curriculum Expert	Higher Education Department
2.	Mr. Mubashar Chishtee	CEO	Coding Phoenix
3.	Mr. Muhammad Hamza Ikhlaq	Network Engineer	HEC
4.	Mr. Agha Ali Zulqarnain	Subject Expert	IMCB,I-10/1, FDE Islamabad
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