

National Curriculum of Pakistan
2022-23

TECHNICAL EDUCATION

COMPUTER APPLICATION

Grades 9-12



NATIONAL CURRICULUM COUNCIL SECRETARIAT
MINISTRY OF FEDERAL EDUCATION AND
PROFESSIONAL TRAINING, ISLAMABAD
GOVERNMENT OF PAKISTAN

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It is with great pride that we, at the National Curriculum Council Secretariat, present the first core curriculum in Pakistan's 75-year history. Consistent with the right to education guaranteed by Article 25-A of our Constitution, the National Curriculum of Pakistan (2022-23) aspires to equip every child with the necessary tools required to thrive in and adapt to an ever-evolving globalized world.

The National Curriculum is in line with international benchmarks, yet sensitive to the economic, religious, and social needs of young scholars across Pakistan. As such, the National Curriculum aims to shift classroom instruction from rote learning to concept-based learning.

Concept-based learning permeates all aspects of the National Curriculum, aligning textbooks, teaching, classroom practice, and assessments to ensure compliance with contemplated student learning outcomes. Drawing on a rich tapestry of critical thinking exercises, students will acquire the confidence to embark on a journey of lifelong learning. They will further be able to acknowledge their weaknesses and develop an eagerness to build upon their strengths.

The National Curriculum was developed through a nationwide consultative process involving a wide range of stakeholders, including curriculum experts from the public, private, and non-governmental sectors. Representatives from provincial education departments, textbook boards, assessment departments, teacher training departments, *deeni madaris*, public and private publishers, private schools, and private school associations all contributed their expertise to ensure that the National Curriculum could meet the needs of all Pakistani students.

The experiences and collective wisdom of these diverse stakeholders enrich the National Curriculum, fostering the core, nation-building values of inclusion, harmony, and peace, making the National Curriculum truly representative of our nation's educational aspirations and diversity.

I take this opportunity to thank all stakeholders, including students, teachers, and parents who contributed to developing the National Curriculum of Pakistan (2022-23)

Dr. Mariam Chughtai

Director

National Curriculum Council Secretariat

Ministry of Federal Education and Professional Training

Computer Applications

Grades 11-12

Progression Grid (PG)

Domain A: Introduction to Computers Applications

Standard: Students will be able to understand the basic components of computers and analyze their applications in diverse fields.

Grade 11	Grade 12
<p>Benchmark 1 : Students will be able to differentiate between system software and application software.</p> <p>Benchmark 2 : Students will be able to explore the evolution of given software applications and assess their impact on society.</p>	
<p>Students will be able to...</p> <p>[SLO:CA-11-A-01]:</p> <p>Define and explain the fundamental components of a computer system:</p> <ul style="list-style-type: none">● Introduction to computers● Computer Hardware <p>[SLO:CA-11-A-02]:</p>	<p>Students will be able to...</p> <p>[SLO:CA-12-A-01]:</p> <p>Analyze the applications of computers in diverse industries such as:</p> <ol style="list-style-type: none">1. Healthcare2. Finance3. Manufacturing4. Education

Discuss different operating systems such as

- Computer Software
- MS Windows 10
- MS Windows 11
- LINUX
- UNIX
- Android
- MAC OS

5. Retail
6. Transportation
7. Energy
8. Agriculture
9. Entertainment
10. Telecommunications
11. Government
12. Construction
13. Hospitality
14. Space Exploration
15. Environmental Science
16. Communication and Media
17. Human Resources
18. Legal Services

[SLO:CA-11-A-03]:

Students will be able to differentiate between hardware and software components by their category, characteristics and function. (One example is the

[SLO:CA-12-A-02]:

Students will be able to explore the evolution of applications of software listed below and assess their impact on society.

1. Early Software Applications

category of software such as system software and application software).

[SLO:CA-11-A-04]:

Students will be able to explain the interaction between hardware and software by reviewing applications and software installation, system maintenance and performance as well as networking

[SLO:CA-11-A-05]:

Students will be able to identify and explain the basics of operating systems such as user interface, system security and file management with a focus on Windows 10/11.

2. Mainframe and Batch Processing
3. Rise of Personal Computing
4. Graphical User Interfaces (GUIs)
5. Client-Server Architecture
6. Internet and Web Applications
7. Mobile Applications
8. Cloud Computing and SaaS
9. Social Media Platforms
10. E-commerce and Online Services
11. Big Data and Analytics Software
12. Artificial Intelligence and Machine Learning Applications
13. Augmented Reality (AR) and Virtual Reality (VR)
14. Blockchain Applications
15. Internet of Things (IoT) Software
16. Automation and Robotics Software
17. Open Source Software Movement
18. Ethical and Societal Impacts of Software Applications

Domain B: Word Processing

Standard: Students will be able to demonstrate proficiency in using word processing software and utilize advanced features of word processing software for professional documents.

Grade 11	Grade 12
Benchmark 1 Students will be able to create complex documents, use advanced formatting features, and integrate proofreading tools effectively.	
Student Learning Outcomes	
<p>[SLO:CA-11-B-01]: Students will be able to introduce word processing and its additional features such as formatting text</p> <p>[SLO:CA-11-B-02]: Students will be able to compare and contrast different word processor software</p>	<p>[SLO:CA-12-B-01]: Students will be able to create professional documents with advanced formatting features including:</p> <ol style="list-style-type: none">1. Google doc2. Styles and Formatting Pane3. Document Protection4. Cross-referencing5. Track Changes6. Spell Check and Grammar

	<ul style="list-style-type: none"> 7. Export and Sharing 8. Mail merge
<p>[SLO:CA-11-B-03]:</p> <p>Student will able to apply various components to enhance document structure such as:</p> <ul style="list-style-type: none"> 1. Tables 2. Images 3. Headers 4. Footers 5. Tables of Contents 6. Sections and Page Breaks 7. Columns 8. Watermarks 9. Page Numbers 10. Captions and Labels 	<p>[SLO:CA-12-B-02]:</p> <p>Student will be able to utilize proofreading and editing tools to enhance quality of professional documents</p>

Domain C: Spreadsheets

Standard: Students will be able to apply advanced spreadsheet techniques for data analysis and visualization.

Grade 11	Grade 12
Benchmark I: Students should be able to create, format, and analyze data using complex formulas, functions, and advanced charting features.	
<p>[SLO:CA-11-C-01]:</p> <p>Students will be able to define and explain structure and purpose of spreadsheets, create and format spreadsheets for data entry by applying the skills listed below:</p> <ul style="list-style-type: none">● Data Entry Techniques● Formatting Cells (Font, Alignment, Borders)● Cell Formatting (Number, Date, Currency)● Adjusting Row and Column Size● Inserting and Deleting Rows and Columns● Copying and Pasting Data● AutoFill Feature for Quick Data Entry● Sorting Data● Filtering Data● Creating Simple Charts (Bar, Pie, Line)	<p>[SLO:CA-12-C-01]:</p> <p>Students will be able to implement advanced formulas and functions for complex data analysis by using:</p> <ul style="list-style-type: none">● Mathematical Functions● Logical Functions● Text Functions● Lookup and Reference Functions● Date and Time Functions● What-IF Analysis Tools

- Printing Spreadsheets
- Saving and Sharing Spreadsheets
- Cell Comments for Annotations
- Freeze Panes for Easy Navigation

[SLO:CA-11-C-02]:

Students will be able to use formulas and functions to analyze and manipulate data by applying:

1. Basic Formulas and Functions
2. Basic Arithmetic Formulas
3. SUM Function for Totaling
4. AVERAGE Function for Calculating Mean
5. MIN and MAX Functions for Finding Extremes
6. COUNT and COUNTA Functions
7. IF Function for Conditional Analysis
8. VLOOKUP and HLOOKUP Functions
9. INDEX and MATCH Functions
10. CONCATENATE and TEXT Functions for String Manipulation
11. DATE and TIME

[SLO:CA-12-C-02]:

Students will be able to create visually appealing charts for effective data visualization by:

1. Choosing the Right Chart Type
2. Creating Bar Charts
3. Designing Column Charts
4. Constructing Line Charts
5. Crafting Pie Charts
6. Developing Scatter Plots
7. Building Area Charts
8. Designing Radar Charts
9. Creating Bubble Charts
10. Combining Chart Types
11. Customizing Colors and Styles
12. Adding Data Labels and Annotations

<p>12. Logical Functions (AND, OR, NOT)</p> <p>13. Nested Formulas for Complex Calculations</p> <p>14. Text-to-Columns for Data Separation</p> <p>15. PivotTables for Data Summarization</p> <p>16. Data Consolidation Techniques</p>	<p>13. Creating Trendlines for Analysis</p> <p>14. Dynamic Charts with Data Tables</p> <p>15. Interactive Charts with Hyperlinks</p> <p>16. Exporting and Sharing Charts</p>
	<p>[SLO:CA-12-C-03]:</p> <p>Students will be able to identify and apply data visualization techniques by:</p> <ol style="list-style-type: none"> 1. Choosing the Right Chart Type 2. Creating Bar Charts 3. Designing Column Charts 4. Constructing Line Charts 5. Crafting Pie Charts 6. Developing Scatter Plots 7. Building Area Charts 8. Customizing Colors and Styles 9. Adding Labels and Annotations 10. Constructing Trendlines for Analysis 11. Constructing Dynamic Charts with Data Tables

	12. Building Interactive Charts with Hyperlinks 13. Exporting and Sharing Visualizations
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Domain D: Presentations

Standard: Students will be able to create effective presentations using presentation software and advanced presentation techniques for professional settings.

Grade 11	Grade 12
<p>Benchmark I: Students should be able to create engaging slides, add multimedia elements, and deliver presentations confidently.</p> <p>Benchmark II: Students should be able to create complex presentations, integrate advanced multimedia, and deliver presentations in a professional manner..</p>	
<p>[SLO:CA-11-D-01]:</p> <p>Student will be able to identify and apply the basics of presentation software by:</p> <ul style="list-style-type: none"> ● Creating slides ● Adding multimedia elements and animations ● Practicing delivery of presentations 	<p>[SLO:CA-12-D-01]:</p> <p>Student will be able to utilize advanced features of presentation software for complex presentations by applying:</p> <ol style="list-style-type: none"> 1. Custom Slide Transitions 2. Animation Effects for Objects

	<ol style="list-style-type: none"> 3. Consistent Design 4. Customizing Slide Backgrounds 5. Embedding Multimedia (Audio, Video) 6. Hyperlinks for Navigation 7. Action Buttons for Interactivity 8. Custom Shapes and SmartArt Graphics 9. 3D Models and Perspectives 10. Advanced Chart Creation and Editing 11. Data Linkage for Dynamic Updates 12. Custom Slide Shows and Sections 13. Presenter View for Speaker Guidance 14. Recording of Narrations and Timings 15. Collaborative Editing and Comments 16. Exporting Presentations to Different Formats
<p>[SLO:CA-11-D-02]:</p> <p>Students will be able to create effective slides with appropriate multimedia elements by:</p> <p>Identifying Effective Slide Design</p> <p>Choosing the Right Slide Layouts</p>	<p>[SLO:CA-12-D-02]:</p> <p>Students will be able to integrate multimedia elements seamlessly for enhanced engagement by adding animations while creating advanced presentations</p>

<p>Applying Consistent Theme and Color Scheme</p> <p>Using High-Quality Images</p> <p>Incorporating Relevant Icons</p> <p>Selecting Appropriate Fonts</p> <p>Ensuring Readability and Contrast</p> <p>Applying Strategic Use of Bullet Points</p> <p>Utilizing SmartArt for Visual Representation</p> <p>Embedding Videos for Engagement</p> <p>Adding Audio for Narration or Background</p> <p>Creating Animated Text and Objects</p> <p>Customizing Slide Transitions</p> <p>Using Interactive Elements (Buttons, Hyperlinks)</p> <p>Applying Collaborative Editing and Comments</p> <p>Using Slide Notes for Additional Information</p>	
<p>[SLO:CA-11-D-03]:</p> <p>Students will be able to deliver presentations with proper use of animations by:</p> <ol style="list-style-type: none"> 1. Identifying elements of Animated Presentations 2. Applying Purposeful Use of Animations 	<p>[SLO:CA-12-D-03]:</p> <p>Students will be able to deliver presentations in a professional setting by:</p> <ol style="list-style-type: none"> 1. Preparing and Planning the Presentation 2. Knowing their Audience

3. Planning Animation Sequences
4. Using Entrance Animations
5. Implementing Exit Animations
6. Emphasizing with Emphasis Animations
7. Creating Motion Paths
8. Applying Advanced Animation Timing
9. Adding Sound to Animations
10. Consistent Animation Styles
11. Avoiding Overuse of Animations
12. Rehearsing Animations for Timing
13. Dynamic Slide Transitions
14. Customizing Animation Effects
15. Maintaining Professionalism in Animated Presentations

3. Structuring their Presentation
4. Crafting Clear and Concise Messages
5. Using Visual Aids Effectively
6. Practicing Delivery and Timing
7. Managing Nervousness and Anxiety
8. Establishing Eye Contact and Body Language
9. Speaking Clearly and Audibly
10. Handling Questions and Interactions
11. Adapting to Unexpected Situations
12. Engaging the Audience
13. Utilizing Technology with Confidence
14. Demonstrating Professionalism
15. Applying effective Use of Pause and Pacing
16. Applying Storytelling Techniques
17. Addressing Technical Issues
18. Seeking and Incorporating Feedback

Domain E: Building Websites

Standard: Students will be able to understand the basics of website building and optimize and manage websites effectively for diverse user experiences.

Grade 11	Grade 12
<p>Benchmark I: Students should be able to explain domain registration, hosting, and build a basic website using WordPress</p> <p>Benchmark II : Students should be able to optimize websites for mobile users, perform backups, and restore websites</p>	
<p>[SLO:CA-11-E-01]:</p> <p>Student will be able to explain the concepts of domain registration and hosting by:</p> <ul style="list-style-type: none"> ● Identifying basic features of websites and webpages ● Practicing word press ● Creating websites ● Domain registration & hosting 	<p>[SLO:CA-12-E-01]:</p> <p>Students will be able to optimize websites for a seamless experience on mobile devices by identifying and applying:</p> <ol style="list-style-type: none"> 1. Responsive Web Design Principles 2. Mobile-Friendly Navigation 3. Optimized Images for Mobile 4. Media Queries 5. Mobile-Friendly Forms 6. Touch-Friendly Design Elements

[SLO:CA-11-E-02]:

Students will be able to explain the features of WordPress for website building by learning and applying:

1. User-Friendly Interface
2. Themes for Design Customization
3. Plugins for Added Functionality
4. Content Management System (CMS) Capabilities
5. Blogging Features
6. Media Management (Images, Videos)
7. Page and Post Creation
8. Customization with Widgets
9. User and Role Management
10. Search Engine Optimization (SEO) Tools
11. E-commerce Integration with WooCommerce
12. Regular Updates and Support
13. Multilingual Support
14. Analytics and Insights

[SLO:CA-12-E-02]:

Students will be able to perform backups and restores to ensure website data integrity by identifying and applying:

1. Regular Backups
2. Manual Backup Procedures
3. Automated Backup Solutions
4. Choice of Backup Frequency
5. Selective Data Backup
6. Off-site Backup Storage
7. Backup Verification and Testing
8. Creation of a Backup Schedule
9. Emergency Backup Protocols
10. Full vs. Incremental Backups
11. Restoration of Entire Websites
12. Backup Documentation and Logs
13. Monitoring and Alerts for Backup Status

[SLO:CA-11-E-03]:

Students will be able to create a basic website using WordPress by:

1. Setting Up a WordPress Account
2. Choosing a Domain Name and Hosting
3. Installing WordPress
4. Logging into the WordPress Dashboard
5. Selecting and Installing a Theme
6. Customizing the Site Identity
7. Creating and Customizing Pages
8. Adding and Formatting Text
9. Uploading Images and Media
10. Creating Navigation Menus
11. Adding Widgets to the Sidebar
12. Installing and Activating Plugins
13. Configuring Basic Plugin Settings
14. Creating a Blog Page
15. Adding and Managing Blog Posts
16. Configuring Permalinks

Domain F: Computer Security and Ethics

Standard: Students will be able to develop awareness of computer security threats and master advanced computer security concepts and ethical considerations.

Grade 11	Grade 12
<p>Benchmark I: Students should be able to identify common computer security threats and implement basic security measures.</p> <p>Benchmark II: Students should be able to analyze and respond to complex security threats and discuss ethical considerations in the field..</p>	
<p>[SLO:CA-11-F-01]:</p> <p>Students will be able to identify and explain common computer security threats by identifying:</p> <ol style="list-style-type: none"> 1. Malware 2. Phishing Attacks 3. Ransomware 4. Social Engineering 5. Password Attacks 6. Denial-of-Service (DoS) Attacks 	<p>[SLO:CA-12-F-01]:</p> <p>Students will be able to analyze and respond to advanced computer security threats through security awareness training and education by identifying and resolving:</p> <ol style="list-style-type: none"> 1. Advanced Persistent Threats (APTs) 2. Malware Analysis and Response 3. Insider Threats and Privilege Escalation 4. Social Engineering Attacks 5. Advanced Phishing Techniques

<ol style="list-style-type: none"> 7. Man-in-the-Middle (MitM) Attacks 8. Unsecured IoT Devices 9. Physical Security Threats 10. Supply Chain Attacks 11. Browser-based Attacks 12. Wi-Fi Eavesdropping 13. Credential Theft 	<ol style="list-style-type: none"> 6. Cybersecurity Forensics 7. Security Patching and Updates 8. Network Anomaly Detection
<p>[SLO:CA-11-F-02]:</p> <p>Students will be able to demonstrate knowledge of basic security measures and best practices by performing the following tasks:</p> <ol style="list-style-type: none"> 1. Password Management 2. Two-Factor Authentication 3. Regular Software Updates 4. Use of Antivirus and Anti-malware Software 5. Firewalls and Network Security 6. Secure Wi-Fi Practices 7. Regular Data Backups 8. User Account Management 	<p>[SLO:CA-12-F-02]:</p> <p>Students will be able to discuss and apply ethical considerations in computer applications and security by identifying the importance of:</p> <ol style="list-style-type: none"> 1. Ethical Considerations in Computer Applications 2. Privacy Protection and Data Security 3. User Consent and Informed Consent 4. Fair Use of Information 5. Intellectual Property Rights 6. Cybersecurity Ethics 7. Legal and Regulatory Compliance 8. Ethical Hacking and Penetration Testing

<ul style="list-style-type: none"> 9. Employee Training and Awareness 10. Secure Web Browsing Habits 11. Mobile Device Security 12. Secure File Sharing 13. Secure Email Practices 14. Secure Cloud Storage 	<ul style="list-style-type: none"> 9. Avoiding Discrimination in Technology 10. Social Impact of Computer Applications 11. Environmental Impact of Technology 12. Ethical Considerations in AI and Machine Learning 13. Digital Divide and Access to Technology 14. Ethical Considerations in Data Collection and Analysis 15. Ethical Decision-making in Computer Security
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Domain G: Emerging Trends and Technologies

Standard: Students will be able to integrate emerging technologies in computing and their applications by analyzing and applying emerging technologies in practical scenarios.

Grade 11	Grade 12
<p>Benchmark 11th : Students should be able to identify and explain the basic concepts of emerging technologies.</p> <p>Benchmark 12th : Students should be able to assess the impact of emerging technologies and apply them in real-world contexts.</p>	

[SLO:CA-11-G-01]:

Students will be able to define and explain the concept of emerging technologies in computing.

[SLO:CA-12-G-01]:

Student will be able to analyze the impact of emerging technologies on current computing practices by identifying and applying:

1. Basic principles of Emerging Technologies
2. Artificial Intelligence and Machine Learning
3. Internet of Things (IoT)
4. Blockchain Technology
5. Augmented Reality (AR) and Virtual Reality (VR)
6. Quantum Computing
7. 5G Technology
8. Edge Computing
9. Biotechnology and Computing
10. Autonomous Systems and Robotics
11. Cybersecurity in the Age of Emerging Technologies
12. Data Analytics and Big Data
13. Impact on Cloud Computing
14. Human-Computer Interaction
15. Sustainable Computing Practices

[SLO:CA-11-G-02]:

Student will be able to explore the application of emerging technologies in various industries such as:

1. Healthcare
2. Finance
3. Manufacturing
4. Education
5. Retail
6. Transportation
7. Energy
8. Agriculture
9. Entertainment
10. Telecommunications

[SLO:CA-12-G-02]:

Student will be able to apply emerging technologies in practical scenarios and evaluate their effectiveness by:

1. Practical Implementation of AI in Customer Support Systems
2. Deploying IoT for Smart Home Automation and Energy Management
3. Applying Robotics and Automation in Manufacturing Processes
4. Using Virtual Reality for Training and Simulation in Education
5. Applying AI-driven Predictive Maintenance in Energy Sector
6. Integrating Biotechnology with Computing in Healthcare
7. Applying Telemedicine Solutions using IoT and AI
8. Understanding principles of Autonomous Vehicles and Smart Traffic Management Systems



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