



Sindh Curriculum For BUSINESS MATHEMATICS & STATISTICS (Commerce Group)

Grade XI – XII

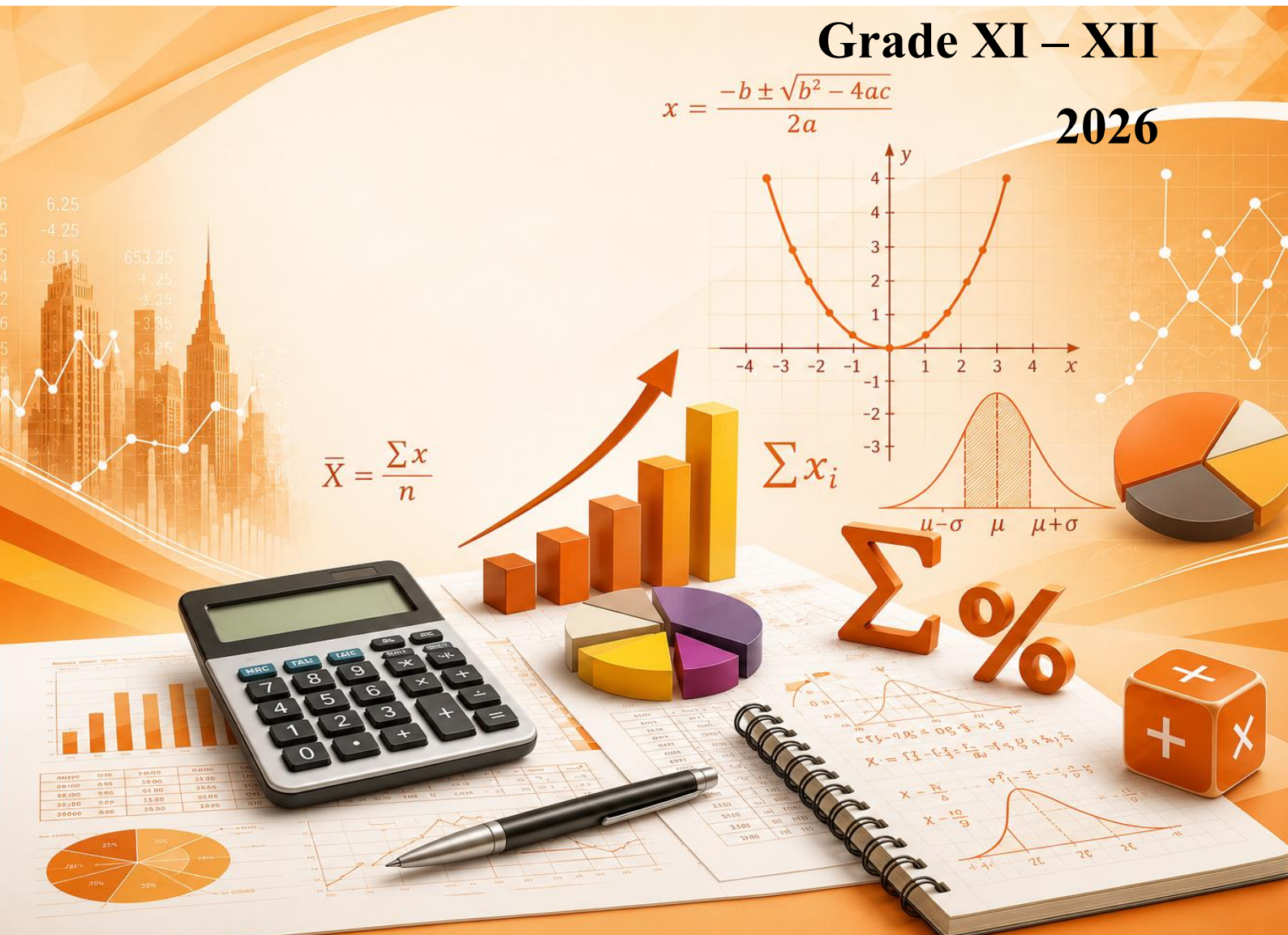
2026

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\bar{X} = \frac{\sum x}{n}$$

$$\sum x_i$$

$$\Sigma \%$$



**GOVERNMENT OF SINDH
EDUCATION & LITERACY DEPARTMENT
DIRECTORATE OF CURRICULUM, ASSESSMENT &
RESEARCH SINDH, JAMSHORO**

Preamble

In pursuance of quality education for all and in alignment with the National Curriculum of Pakistan, the Directorate of Curriculum, Assessment and Research (DCAR) Sindh introduces the Sindh Curriculum for Business Mathematics & Statistics Grade XI – XII (Commerce Group) 2026. In a world where knowledge evolves at an unprecedented pace, this Curriculum reaffirms our commitment to equipping the children of Sindh with contemporary knowledge, critical thinking, 21st-century skills, competencies in technology and artificial intelligence empowering them to thrive provincially, nationally and globally.

This curriculum marks a deliberate shift from rote memorization to conceptual understanding, analytical thinking, student-centered approaches and real-world application. Our aim is to foster creativity, strengthen problem-solving abilities and inspire a passion for lifelong learning. While aligned with national standards and global best practices, this Curriculum remains deeply rooted in the rich cultural and social context of Sindh.

The Curriculum serves as a comprehensive roadmap for all stakeholders, including educators, textbook developers, assessment experts and school leaders. It features clearly articulated standards, benchmarks and grade-wise Student Learning Outcomes (SLOs) that act as measurable milestones for student progress. With strong vertical and horizontal alignment, the curriculum builds on prior learning, promotes cross-disciplinary connections and prepares students for both academic achievement and real-life challenges.

To ensure effective implementation, the Curriculum provides detailed guidelines for instruction, textbook and teacher guide development and student assessment. These components work in harmony to support a coherent and practical application of the curriculum across classrooms.

The development of this curriculum was a deeply collaborative and consultative process involving a diverse group of experts, practicing teachers, academicians and partners from both the public and private sectors. Their collective insight was instrumental in shaping a Curriculum that is contextually relevant, age appropriate and responsive to the needs of learners.

The ink never dries on a curriculum; it is an ongoing journey. As such, this is a living document, open to periodic review and refinement. We welcome and encourage feedback from all users to ensure it continues to evolve in line with the educational aspirations of Sindh.

Noor Ahmed Khoso

Director,

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1. Introduction

In alignment with the constitutional commitment of the Directorate of Curriculum, Assessment & Research (DCAR) Sindh to quality education for all, this curriculum addresses the critical need for a modern Business Mathematics & Statistics curriculum for HSC (Commerce Group). In the modern commercial environment, decisions are no longer based on intuition alone. The ability to understand, analyse and interpret data is a critical competency for success. This Business Mathematics and Statistics curriculum, designed for the Grade XI and XII Commerce Group in Sindh, provides the essential quantitative foundation necessary for future business leaders, entrepreneurs and professionals to navigate a complex, data-driven world.

The curriculum is crafted to be both intellectually rigorous and practically relevant, linking mathematical and statistical methods to real commercial problems in Sindh, Pakistan and beyond. By mastering quantitative reasoning, students will learn to model business systems, evaluate financial instruments, summarise and interpret data and use digital tools to support evidence-based decisions. The learning journey is structured to be progressive: Grade XI establishes a strong foundation in core algebra, financial mathematics and descriptive statistics, while Grade XII builds upon this foundation, introducing more complex financial models, regression and forecasting, optimization and inferential statistics.

1.1 Rationale

The primary goal of this curriculum is to bridge the gap between abstract mathematical theory and practical business application. Students will learn to model real-world commercial problems, analyse financial instruments, interpret statistical data and use digital tools to support evidence-based decision-making. This course moves beyond simple calculation to emphasize analytical thinking, financial literacy and quantitative reasoning within locally relevant contexts.

The development of this curriculum is driven by the recognition that quantitative literacy has become a defining competency of the modern workforce. As Sindh and Pakistan navigate digital transformation, expanding financial markets and data-rich business environments, commerce graduates must be able to reason with numbers, evaluate financial choices and draw sound conclusions from data. This curriculum directly addresses that need by integrating foundational mathematics with applied statistics and spreadsheet-based analysis, preparing students for further study and for careers in banking, finance, business management, data analysis and entrepreneurship.

1.2 Vision and Aims of the Curriculum

Our vision is to develop quantitatively literate, analytically skilled and ethically responsible individuals who can model commercial problems, interpret business data with confidence and make informed, evidence-based decisions that contribute to a prosperous and sustainable economic future for Sindh and Pakistan.

This curriculum aims to empower students with the following knowledge, skills and values:

Knowledge and Conceptual Understanding

- Understand core concepts of business mathematics, including percentages, ratio and proportion, linear and quadratic models, matrices and introductory calculus, and their role in commercial decision-making.
- Master the principles of financial mathematics, simple and compound interest, present and future value, annuities, loan repayment and investment appraisal, including locally relevant instruments such as modes of Islamic finance and Pakistan Savings Certificates.

- Comprehend the statistical cycle of collecting, organising, presenting, summarising and interpreting business data, extending to index numbers, probability, sampling and basic statistical inference.

Skills

- Model real-world commercial problems using algebraic, matrix and calculus-based techniques and interpret the solutions for business decisions.
- Apply statistical methods to summarise data, measure variability, analyse relationships, forecast outcomes and test hypotheses in business contexts.
- Use spreadsheet software fluently for calculation, modelling, data management and visualisation, verifying digital results against manual computation.
- Communicate quantitative findings clearly, presenting calculations, charts and conclusions in non-technical business language.

Attitudes and Values

- Internalize the discipline of evidence-based decision-making, asking not only *how* to calculate but *why* a method is used and *what* the result means for a business decision.
- Value accuracy, precision and intellectual honesty in the collection, analysis and reporting of data.
- Foster ethical responsibility in the use of financial and statistical information, recognising the consequences of misleading figures for customers, investors and society.
- Cultivate confidence and curiosity toward quantitative problem solving as a foundation for lifelong learning.

1.3 Guiding Principles

This curriculum marks a deliberate shift from rote computation to a conceptual, application-based and student-centred approach. Its design is guided by the following principles:

- **Application-Centric:** Every mathematical concept is introduced and assessed through its application in a business scenario (e.g., profit and loss, market analysis, investment, quality control).
- **Progressive Scaffolding:** Grade XI establishes a strong foundation in core algebra, financial mathematics and descriptive statistics; Grade XII builds upon this foundation, introducing more complex models, inferential statistics and advanced applications.
- **Data and Digital Literacy:** The curriculum explicitly integrates the use of modern digital tools, particularly spreadsheet software, as a core competency for calculation, visualisation and modelling.
- **Critical Thinking:** The focus is not just on *how* to calculate, but *why* a particular method is used and *what* the results mean for a business decision.
- **Local Relevance:** Problems and examples are contextualized within Sindh and Pakistani business environments (e.g., local SMEs, microfinance, retail markets) to enhance student engagement and understanding.
- **Outcome-Focused Design:** The curriculum is structured around clear and measurable Standards, Benchmarks and Student Learning Outcomes (SLOs) to ensure a logical and progressive learning path from Grade XI to XII.

1.4 Curriculum Development Process

This curriculum is the product of a rigorous, collaborative and multi-stage development process led by the Directorate of Curriculum, Assessment & Research (DCAR) Sindh. A dedicated Provincial Review Committee, comprising practicing commerce and mathematics teachers, academicians, curriculum specialists and assessment professionals, guided this comprehensive undertaking.

The process began with a thorough needs assessment, which included a critical review of the existing syllabus, a comparative analysis against national and international standards for quantitative and statistical education, and extensive consultations with the Sindh Textbook Board and teacher trainers. Crucially, this research phase incorporated widespread feedback from teachers and other key stakeholders to ensure the curriculum is both academically sound and practically implementable. A systematic cross-check against the SSC Mathematics and General Mathematics curricula was undertaken so that Grade XI–XII outcomes extend, rather than repeat, prior learning.

Informed by this evidence, the committee established the curriculum's core philosophy, domains, standards and benchmarks. This foundation guided the iterative cycles of drafting, reviewing and refining the core syllabus, including its learning outcomes, assessment scheme and guidelines for textbooks, teaching strategies and professional development. This approach ensured the final document is relevant, high-quality and fully aligned with the educational aspirations of Sindh.

1.5 Major Changes and Key Features

This revised curriculum introduces significant enhancements to deepen student learning. It features a coherent set of **58 Student Learning Outcomes (SLOs)** across **seven domains**, each specific, observable and measurable, with the overwhelming majority pitched at the Apply level of Bloom's taxonomy or above. Content that duplicated the SSC Mathematics curriculum has been systematically removed or elevated to a higher cognitive level, so that every outcome represents genuine progression beyond Grade X.

Key features include a dedicated domain for **Computational Thinking & Digital Tools**, with spreadsheet-based modelling and analysis integrated across all domains; **bridge SLOs and prerequisite notes** that support students entering from SSC General Mathematics; and the inclusion of locally relevant financial content such as **modes of Islamic finance** and **Pakistan Savings Certificates**. The two-year progression pairs Grade XI foundations (algebraic modelling, financial mathematics, descriptive statistics, probability) with Grade XII applications (annuities and investment appraisal, regression and forecasting, optimization, index numbers and statistical inference).

The document provides **detailed guidelines** for creating textbooks that promote active learning, for implementing a variety of **authentic assessment strategies** and for the mandatory **Teacher's Guide** and **Practical/Project Manual**. Furthermore, it includes grade-wise **domain weightage tables** and a **cognitive level breakdown** aligned to the 50-mark per-year scheme of assessment, alongside a comprehensive framework for the **Continuous Professional Development (CPD)** of teachers. A strong emphasis is placed on using examples and data from **Sindh and Pakistan's economy** to ensure contextual relevance.

1.6 Organisation of the Curriculum Document

The curriculum is organised into a clear, multi-level structure to ensure ease of use and implementation:

- **Domains:** The seven broad thematic areas of business mathematics and statistics (e.g., Analytical Thinking & Numerical Reasoning, Business Finance & Mathematics of Investment, Descriptive Statistics & Data Presentation).
- **Standards:** Overarching goals that define what students should know and be able to do within each domain.

- **Benchmarks:** Key checkpoints that describe the knowledge and skills students are expected to achieve by the end of each grade, Benchmark I for Grade XI and Benchmark II for Grade XII.
- **Student Learning Outcomes (SLOs):** Specific, grade-level competencies that are observable and measurable, providing clear targets for teaching and assessment.

These components are supported by detailed sections on **Assessment and Evaluation, Teaching and Learning Strategies, Guidelines for Textbook Development** and **Continuous Professional Development (CPD)**, which together form a complete and cohesive framework for modern business mathematics and statistics education in Sindh.

2. Progression Grid

The curriculum is structured around seven core domains, which represent the key competencies students will develop:

1. **Domain A, Analytical Thinking & Numerical Reasoning:** Applying numerical operations and algebraic reasoning to model business systems.
2. **Domain B, Business Finance & Mathematics of Investment:** Evaluating financial instruments and investment decisions.
3. **Domain C, Descriptive Statistics & Data Presentation:** Collecting, organising, visualising and interpreting business data.
4. **Domain D, Computational Thinking & Digital Tools:** Using spreadsheet technology to solve business problems.
5. **Domain E, Counting Techniques, Correlation, Regression & Probability:** Analysing relationships between variables and quantifying uncertainty for forecasting and risk assessment.
6. **Domain F, Business Optimization & Advanced Modeling:** Using matrices and introductory calculus for business optimization.
7. **Domain G, Index Numbers, Sampling & Inferential Statistics:** Constructing economic indicators and using samples to make inferences and strategic decisions.

For each domain, Benchmark I and the Grade XI learning outcomes define the first-year expectations, while Benchmark II and the Grade XII learning outcomes define the second-year expectations.

Domain A: Analytical Thinking & Numerical Reasoning	
Standard 1: Students will apply numerical operations and algebraic reasoning to model business scenarios and solve commercial problems.	
Benchmark I: Students will demonstrate foundational proficiency in using basic mathematical operations, linear equations, number sequences and series, and proportional reasoning to analyse simple business systems and make evidence-based decisions in local contexts.	Benchmark II: Students will demonstrate proficiency in using quadratic functions, systems of equations and basic inequalities to solve business problems and optimize simple commercial decisions.
Grade XI Learning Outcomes	Grade XII Learning Outcomes
BMS-11-A-01 (A+): Apply multi-step percentage calculations to solve commercial problems involving trade discounts, tax, markup and markdown in retail and trade contexts.	BMS-12-A-01 (A+): Construct the graph of a quadratic function, identify the vertex and intercepts, and interpret the maximum profit or minimum cost point for a stated business problem.
<i>[Through case studies]</i>	

	<i>Prerequisite: Solving quadratic equations (SSC Mathematics Grade IX, Unit 8, or BMS Grade XI equivalent). Students from SSC General Mathematics programmes require additional teacher support at this point; see Teacher's Guide supplement.</i>
BMS-11-A-02 (A+): Analyse ratio and proportion relationships to determine production and cost allocation in local business scenarios.	BMS-12-A-02 (A+): Represent the feasible region for a two-variable linear inequality system and identify all corner-point solutions for a resource constraint problem.
BMS-11-A-03 (A+): Construct linear cost-revenue models in two variables, determine break-even points graphically, and interpret results for a business decision.	BMS-12-A-03 (A+): Solve a two-variable linear programming problem using the graphical method to determine the production or resource allocation that maximises profit or minimises cost.
BMS-11-A-04 (A+): Solve systems of two linear equations along with graphical representation using substitution and elimination methods to determine optimal pricing or resource allocation in two-variable business problems.	
BMS-11-A-05 (A+): Calculate the n th term and the sum of a finite arithmetic or geometric series for a business scenario, and explain how the geometric series underlies compound interest and annuity accumulation.	

Domain B: Mathematics of Business Finance & Investment

Standard 1: Students will evaluate financial instruments and economic decisions using mathematical principles for informed personal and business planning.

Benchmark I: Students will calculate and compare basic financial models including simple and compound interest.

Benchmark II: Students will analyse loans, bonds and investments using ordinary annuity calculations and simple investment evaluation methods for practical financial planning.

Grade XI Learning Outcomes

Grade XII Learning Outcomes

BMS-11-B-01 (A+): Calculate simple interest and compound interest for annual and semi-annual compounding periods and compare their accumulation over equivalent time periods.

BMS-12-B-01 (A+): Calculate the future and present values of an ordinary annuity and apply the results to evaluate a savings plan or loan arrangement.

BMS-11-B-02 (A+): Differentiate between nominal and effective annual interest rates and calculate the effective rate for annual compounding arrangements.

BMS-12-B-02 (A+): Calculate the equal monthly instalment (EMI) for a loan using the standard formula and construct a five-period loan repayment schedule.

BMS-11-B-03 (A+): Calculate the present value and future value of a single cash amount and apply the results to compare two investment options.

BMS-12-B-03 (A+): Calculate the periodic deposit required to accumulate a target amount using the sinking fund formula.

BMS-11-B-04 (U): Explain modes of Islamic finance and its practical application in business.

BMS-12-B-04 (A+): Compare two investment options using payback period and net present value, and select the preferred option with justification.

	BMS-12-B-05 (A+): Explain the concepts of face value, coupon rate and maturity for a Pakistan Savings Certificate and calculate the total return over the investment period.
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Domain C: Descriptive Statistics & Data Presentation	
Standard 1: Students will collect, organise, visualise and interpret business data using basic statistical methods to support simple business decisions.	
Benchmark I: Students will demonstrate skills in data collection, basic statistical measures and simple data visualisation to summarise business information for local contexts.	Benchmark II: Students will demonstrate skills in advanced descriptive statistics and data interpretation to analyse business performance and compare different datasets.
Grade XI Learning Outcomes	Grade XII Learning Outcomes
BMS-11-C-01 (U, PBA): Define data and its classification, and use a provided questionnaire to collect a small primary dataset for local market research. <i>[Include questionnaires as resource in the textbook]</i>	BMS-12-C-01 (A+): Calculate quartiles, deciles and the coefficient of variation for a business dataset and use these measures to compare two distributions.
BMS-11-C-02 (A+): Organise raw business data into a grouped frequency distribution table, specifying class boundaries, class width and cumulative frequencies.	BMS-12-C-02 (U): Explain the effect of extreme values and outliers on the mean, median and mode with reference to appropriate data representation, identifying them in a business dataset.
BMS-11-C-03 (A+): Construct appropriate charts (bar chart, pie chart, histogram, frequency polygon) to display a business frequency distribution and select the chart type suited to the data and audience.	BMS-12-C-03 (A+): Analyse and interpret the empirical relationship between mean, median and mode to determine the shape of a distribution (symmetric, positively skewed, negatively skewed) for a business dataset.
BMS-11-C-04 (A+): Calculate the arithmetic mean, median and mode for both raw and grouped business data and select the most appropriate measure to represent a given dataset.	BMS-12-C-04 (A+): Construct multiple bar diagrams and subdivided bar charts to compare business performance across categories or time periods.
BMS-11-C-05 (A+): Calculate the range, variance and standard deviation for a business dataset and interpret each measure in terms of business risk or variability. [PBA: A small project is recommended covering SLOs BMS-11-C-01 to 05]	BMS-12-C-05 (A+): Construct box plots and ogives for business performance data. <i>[Start from introduction of box plot and ogives]</i>

Domain D: Computational Thinking & Digital Tools	
Standard 1: Students will utilize basic spreadsheet knowledge to perform business calculations and create simple data presentations.	
Benchmark I: Students will demonstrate basic proficiency in using spreadsheet formulae and calculators for fundamental business calculations and simple data organisation.	Benchmark II: Students will demonstrate proficiency in using spreadsheet functions for financial calculations, data management and creating professional business reports.
Grade XI Learning Outcomes	Grade XII Learning Outcomes
BMS-11-D-01 (A+, PBA): Build a spreadsheet model with relative and absolute cell references in	BMS-12-D-01 (A+, PBA): Organise a business dataset in spreadsheet software using sort and

multiple spreadsheets that recalculates business outputs when input values change.	filter operations to extract specified subsets of records.
BMS-11-D-02 (A+, PBA): Apply spreadsheet functions (SUM, AVERAGE, MIN, MAX, COUNT, IF) to perform business calculations and verify results against manual computation.	BMS-12-D-02 (A+, PBA): Use financial functions (PMT, FV, PV) and lookup functions (VLOOKUP and HLOOKUP) in spreadsheet software to perform business financial calculations.
BMS-11-D-03 (A+, PBA): Select and construct an appropriate chart type (bar chart, pie chart, line graph, histogram and frequency curve) in spreadsheet software to represent a given business dataset.	BMS-12-D-03 (A+, PBA): Calculate the regression equation for a bivariate business dataset using spreadsheet functions (CORREL, SLOPE, INTERCEPT) and verify results.

Domain E: Counting Techniques, Correlation, Regression & Probability	
Standard 1: Students will analyse relationships between business variables and understand basic probability for simple forecasting and risk assessment.	
Benchmark I: Students will demonstrate basic understanding of correlation and fundamental probability concepts to identify relationships and calculate simple probabilities.	Benchmark II: Students will demonstrate skills in basic regression analysis, simple forecasting and probability applications for business scenarios.
Grade XI Learning Outcomes	Grade XII Learning Outcomes
BMS-11-E-01 (A+): Construct a scatter diagram for a paired business dataset and describe the direction (positive, negative, none) and approximate strength of the relationship observed.	BMS-12-E-01 (A+): Calculate Spearman's rank correlation coefficient for two ranked business variables (at most eight paired observations with no tied ranks) and interpret the result in terms of association strength and direction.
BMS-11-E-02 (A+): Calculate simple correlation coefficient for ungrouped data using basic formula (product-moment method)	BMS-12-E-02 (A+): Determine the linear regression equation ($y = a + bx$) for a bivariate business dataset using the least-squares method and plot the line on a scatter diagram.
BMS-11-E-03 (A+): Apply the fundamental counting principle and factorial notation to calculate the total number of possible arrangements or outcomes for multi-stage business decisions.	BMS-12-E-03 (A+): Use the linear regression equation to forecast a business outcome for a given predictor value and state the limitations of extrapolation beyond the observed data range.
BMS-11-E-04 (A+): Calculate the probability of a single business event using the classical formula and express the result as a fraction, decimal and percentage. <i>[Start with introduction of probability]</i>	BMS-12-E-04 (A+): Calculate conditional probability for two-stage dependent business events using the multiplication rule for dependent events, and represent the sample space with a tree diagram.
BMS-11-E-05 (A+): Calculate probabilities for complex business events using permutation and combination formulae and apply results to inventory, staffing or scheduling scenarios.	BMS-12-E-05 (A+): Calculate the probability of a specified number of successes in a fixed number of trials (not more than five trials and without the use of probability tables) using the binomial probability formula and apply results to quality control or sales forecasting.
BMS-11-E-06 (A+): Apply the addition rule and the multiplication rule of probability to calculate the likelihood of compound business	

events involving mutually exclusive, non-mutually exclusive and independent outcomes.	
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Domain F: Business Optimization & Advanced Modelling

Standard 1: Students will apply basic matrix operations and introductory calculus concepts to solve business problems.

Benchmark I: Students will understand basic matrix operations and apply them to represent and solve simple business systems.

Benchmark II: Students will understand basic calculus concepts and apply simple derivatives to find maximum profit and minimum cost in business situations.

Grade XI Learning Outcomes

Grade XII Learning Outcomes

BMS-11-F-01 (U): Identify and classify matrices by type (row, column, square, rectangular, identity, zero), state the conditions for matrix equality, and explain business contexts in which each type arises.

Bridge SLO: Introduces matrix notation for students from SSC General Mathematics (Humanities track) who have no prior matrix exposure. Students from SSC Mathematics Grade X (Unit 19, Matrices & Determinants) may treat this as a rapid review.

BMS-12-F-01 (A+): Define the derivative as the instantaneous rate of change and calculate derivatives of polynomial functions using the power rule.

Prerequisite: Polynomial expression manipulation (SSC Mathematics Grade IX–X). Calculus is not covered in SSC General Mathematics; additional bridging support is required in the Teacher's Guide for Humanities-track students.

BMS-11-F-02 (A+): Perform addition, subtraction and scalar multiplication of matrices and represent a two-product business cost or production scenario in matrix form.

Bridge SLO: See notation at BMS-11-F-01.

BMS-12-F-02 (A+): Derive expressions for marginal cost and marginal revenue by differentiating given cost and revenue functions and interpret their values at specified production levels.

BMS-11-F-03 (U): Explain the advantages of matrix representation for business systems, organising multi-variable business data (input-output tables, cost matrices, production schedules) into matrix form.

BMS-12-F-03 (A+): Determine the production level that maximises profit or minimises cost (for a single-variable polynomial objective function) by setting the derivative of the objective function to zero and verifying using the second derivative test.

BMS-11-F-04 (A+): Multiply matrices up to 2×3 order and calculate the determinant of a 2×2 matrix to evaluate the solvability of a two-variable business system.

BMS-11-F-05 (A+): Calculate the determinant and multiplicative inverse of a 2×2 matrix and use the inverse matrix method to solve a two-variable business system.

Domain G: Index Numbers, Sampling & Inferential Statistics

Standard 1: Students will construct economic indicators, understand basic statistical inference and apply simple hypothesis testing for business decisions.

Benchmark I: Students will understand index numbers, calculate simple indices and

Benchmark II: Students will compute price and quantity indices, understand confidence intervals

understand basic sampling methods for collecting business data.	conceptually and perform basic hypothesis tests for business quality control.
Grade XI Learning Outcomes	Grade XII Learning Outcomes
BMS-11-G-01 (A+): Explain the purpose and applications of index numbers in measuring price changes, inflation and business trends, and calculate a simple price relative for a single item using the fixed base year, chain indices and shift of base year method.	BMS-12-G-01 (A+): Calculate the quantity index and value index. Using Laspeyres Index number, Paasche's index number and Fisher's Ideal index number using the fixed base year method and interpret each result in the context of business performance measurement.
BMS-11-G-02 (U): Explain probability and non-probability sampling methods.	BMS-12-G-02 (U): Explain how the sampling distribution of the mean approaches normality as sample size increases, with reference to business quality control applications.
	BMS-12-G-03 (U): Explain confidence interval for a population mean using the standard normal distribution for a business survey result.
	BMS-12-G-04 (U): Define hypothesis along with its testing. Also distinguish between Type I error (rejecting a true hypothesis) and Type II error (failing to reject a false hypothesis).

3. Assessment and Evaluation

Assessment is a continuous process that systematically collects, analyses and utilizes data on students' learning progress and performance to improve educational results. It combines formative assessment, which deliver ongoing feedback to enhance teaching and learning, with summative assessment, which measure overall accomplishment at the conclusion of instructional phases.

The primary objective of assessment is to evaluate student's learning outcomes, emphasizing deep understanding, conceptual connections and the application of practical skills rather than rote memorization. It provides educators with valuable insights into instructional effectiveness and facilitates evidence-based decisions to promote student development. Modern assessment practices prioritize mitigating the issues associated with conventional examinations by employing varied and inclusive techniques that encourage analytical reasoning and genuine knowledge expression.

Guiding principles include ensuring strong connections among curriculum, instruction and assessment, incorporating multiple viewpoints and emphasizing equity to address diverse learning preferences. Assessment should help students become independent learners, work together effectively and use real-life evidence to build a complete understanding of progress.

3.1 Shift in Assessment

This shift is critical for developing the advanced capabilities needed to model commercial problems mathematically, analyse business data statistically, evaluate financial decisions, and communicate quantitative findings professionally. These capabilities are measured by performance-based assessments such as conducting a statistical survey of a local market and presenting the findings, building a spreadsheet-based break-even or investment model for a small Sindh enterprise, or preparing a data-driven report that recommends a business decision supported by calculations and charts.

Modern curricula emphasize outcomes such as inquiry, logical reasoning, problem solving, decision-making and teamwork, which are essential for success in a rapidly changing world. Achieving these outcomes requires instruction to shift toward meaningful learning experiences, with assessment practices

evolving in parallel to evaluate them effectively.

Traditional assessments, typically standardized multiple-choice or short-response formats, are useful for gauging foundational knowledge and basic skills. However, they often fall short in assessing higher-order abilities like critical thinking, creativity and practical application and may inadvertently promote rote memorization rather than deeper engagement.

To bridge this gap, educators are increasingly adopting authentic and alternative assessments, such as performance tasks, portfolios, self-reflections and peer evaluations. These approaches situate learning in real-world contexts, employ diverse tools for a more comprehensive understanding of student progress and provide continuous feedback. Research highlights their effectiveness in capturing the depth of learning and instructional impact, while also enhancing motivation by making education more relevant and empowering for students.

3.2 Integrating Assessment into the Learning Process: A Framework for Implementation

To achieve comprehensive curriculum implementation, assessment must be seamlessly embedded within instruction, serving as a dynamic tool for knowledge construction. This integration requires assessments that facilitate open-ended discussions for idea refinement, value diverse viewpoints by acknowledging multiple valid responses, employ multimodal formats extending beyond traditional paper-and-pencil tests, promote age-appropriate skills in analysis, comparison, generalization, prediction and adaptation, encourage collaboration and teamwork in competency demonstration and remain ongoing and cumulative to track longitudinal growth.

Educators should utilize varied methods, such as oral questions, surveys, school-related problem-solving tasks, situational analyses and diverse written formats, including multiple-choice, constructed-response and extended-response questions, to inform daily instructional planning. Based on outcomes, teachers may proceed to new topics, offer remediation, assign reinforcement activities, or modify approaches. Feedback must align with instructional strategies, emphasizing clarification of learning needs and prioritizing improvement over mere grading. In early grades, the emphasis lies on guiding learning and monitoring end-of-year progress, rather than exclusively categorizing performance.

This integration follows a cyclical framework adaptable to teachers' expertise and students' needs:

1. **Define Outcomes:** Select targeted learning outcomes from the curriculum.
2. **Design Assessments:** Determine purpose of assessment (e.g., formative or summative), select appropriate methods and identify the types of assessment data to be collected.
3. **Align Activities:** Develop instructional experiences that incorporate assessment tasks.
4. **Deliver and Assess:** Execute learning activities with embedded assessment.
5. **Collect, Analyse Data:** Gather and interpret assessment evidence to derive meaningful insights into student progress.
6. **Provide Feedback and Refine the Instruction:** Use insights to deliver actionable guidance and adjust teaching strategies.

This framework accommodates diverse learning styles, monitors progress constructively and enhances instruction by highlighting strengths and areas for development. It cultivates an inclusive environment through teacher-student collaboration, student participation in record-keeping and the use of clear, accessible language.

3.3 Roles of Assessors in the Assessment Process

Assessment processes gain fairness and comprehensiveness through the integration of multiple perspectives, ensuring a balanced and thorough evaluation of student learning.

The following outlines key assessors and their roles:

- **Teacher:** Designs and implements assessments using diverse tools, observes individual or group performance and delivers expert feedback to inform and refine instructional strategies.
- **Self-Assessment (Student):** Enables students to reflect on their own work against established criteria, often through logs or journals to document progress, fosters accountability, critical thinking and lifelong learning skills, requires teacher facilitation, particularly in early grades.
- **Peer Assessment:** Involves students evaluating peers' work via checklists or rating scales, develops critical judgment, collaboration and additional insights for teachers, demands clear criteria and accountable participation.
- **Group Assessment:** Involves groups evaluating other groups or individuals, encourages teamwork and collective feedback, extending principles of peer assessment to collaborative settings.

3.4 Classroom Assessment Strategies

Assessment is integrated into daily classroom activities through observation, analysis of student work and active engagement, enabling educators to determine thought processes and rectify misconceptions. Contemporary strategies emphasize continuous feedback, identifying strengths and areas for improvement to facilitate adaptive instruction. The following outlines key strategies, their descriptions and primary benefits:

Strategy	Description	Primary Benefits
Observation	Involves systematic monitoring of student engagement, behavior and skill demonstration during activities (like Jigsaw, Think-pair-share)	Provides real-time insights to support a student-centered learning environment.
Performance-Based & Authentic Assessment	Requires students to apply knowledge and skills by completing authentic, real-world tasks (e.g., projects, presentations, simulations) that demand judgment, innovation and higher-order thinking.	Offers genuine measurement of deep understanding and practical skills beyond rote memorization.
Questioning/Interviews	Entails dynamic dialogues to explore understanding and verbal articulation.	Enhances critical thinking and practical application of concepts.
Journals/Learning Logs/Reflections	Allows students to document thoughts, progress and insights using textual or visual formats.	Reveals individual learning styles, attitudes and fosters self-awareness.
Portfolios	Comprises curated collections of student work that illustrate growth, developed through student-teacher collaboration and reflective practices.	Facilitates longitudinal tracking and sharing of developmental progress.
Paper-and-Pencil Tasks	Utilizes written formats such as multiple-choice questions (MCQs), constructed-response questions (CRQs) and elaborated-response questions (ERQs) to assess knowledge and application.	Supports both formative and summative objectives, with rubrics ensuring transparent evaluation.

3.5 Assessment Tools

These instruments interpret evidence to judge performance levels, using criteria for progress measurement.

Tool	Description	Usage Notes
Checklist	Lists observable criteria for behaviours and skills; student-involved creation possible.	Simple tracking of expectations.
Rating Scales	Criteria judged on scales (e.g., always/rarely or 1-5).	Quantifies performance degrees.
Scoring Rubrics	Detailed criteria across levels (e.g., 2-5 points); holistic (overall) or analytic (element-specific).	Provides in-depth feedback; time-intensive to develop.
Inventories	Surveys or questionnaires on prior knowledge, experiences and interests.	Informs baseline understanding.
Anecdotal Notes	Brief narratives of observations on learning and needs.	Captures nuanced details; requires organisation.

3.6 Bloom's Taxonomy for Assessment

The assessment objectives are directly aligned with the curriculum's competencies, standards, benchmarks and Student Learning Outcomes (SLOs). Assessments will be designed to measure the extent to which students can demonstrate the following abilities:

Cognitive Domain (Based on Bloom's Taxonomy)	Description of Assessed Abilities Students can:	Action Verbs for Assessment (Examples)
The Foundations (Knowledge & Understanding)	recall and recognise facts, terminology, definitions, concepts and principles. They can explain, describe and interpret phenomena, laws, models and theories in their own words.	Recall, Recognise, Define, List, Describe, Explain, Interpret, Summarise
Higher-Order Thinking (Application & Analysis)	apply knowledge and principles to both familiar and unfamiliar situations. They can analyse information by breaking it down into constituent parts, identifying patterns and drawing logical inferences.	Apply, Use, Analyse, Break down, Compare, Contrast, Classify, Identify patterns
Higher-Order Thinking (Synthesis, Evaluation & Creation)	synthesize information from multiple sources to construct arguments, critically evaluate and justify judgments based on evidence, propose innovative solutions, design investigations and create original work.	Synthesize, Evaluate, Justify, Create, Propose, Design, Construct, Critique
Practical & Investigative Skills (Performance Assessment)	plan and conduct investigations safely and effectively. They can use tools, collect, record and present data accurately and analyse experimental results to draw valid conclusions and identify limitations.	Plan, Conduct, Collect, Record, Present, Measure, Demonstrate, Interpret results

3.7 Scheme of Assessment

Following a comprehensive analysis of the number, complexity and cognitive demands of the Student Learning Outcomes (SLOs) across each domain, the proposed assessment scheme ensures alignment with the specified SLOs, cognitive levels and content weightages outlined in this curriculum for all formal examinations. All formal examinations will be aligned with the SLOs, cognitive levels and content weightages specified in this curriculum.

Domain-Wise Weightage Table for Grade XI

Sr. No.	Domain Title	No. of SLOs	Depth/ Cognitive Demand of SLOs	Weightage (%)	Justification
1.	A: Analytical Thinking & Numerical Reasoning	5	High	17%	Core algebraic modelling. Percentage calculations, ratio analysis, linear cost-revenue models, simultaneous equations and arithmetic and geometric series, all applied to commercial decisions at Apply/Analyse level.
2.	B: Business Finance & Mathematics of Investment	4	High	13%	Foundational financial mathematics. Simple and compound interest, nominal versus effective rates, present and future value and modes of Islamic finance, with direct application to personal and business planning.
3.	C: Descriptive Statistics & Data Presentation	5	High	17%	Core statistical practice. Questionnaire design, frequency distributions, statistical charts, measures of central tendency and dispersion, application-heavy skills central to the subject.
4.	D: Computational Thinking & Digital Tools	3	High	10%	Spreadsheet fundamentals (functions, cell referencing, charting) assessed conceptually and through verification against manual computation.
5.	E: Counting Techniques, Correlation, Regression & Probability	6	High	20%	Largest SLO count. Scatter diagrams, Pearson correlation, the addition and multiplication rules of probability and counting principles, all pitched at Apply level.
6.	F: Business Optimization & Advanced Modeling	5	High	17%	Matrix concepts and operations including multiplication, determinants and the inverse method, with bridge content for students entering from SSC General Mathematics.
7.	G: Index Numbers, Sampling & Inferential Statistics	2	Medium	6%	Introductory treatment: purpose and calculation of simple price and quantity relatives and selection of appropriate sampling methods.
	Total for Grade XI	30		100%	

Depth Key:

- **Low:** Primarily knowledge and comprehension (Define, list, state, describe).
- **Medium:** Mix of knowledge, comprehension and application (Explain, differentiate, classify, organise).
- **High:** Dominated by application, analysis, synthesis and evaluation (Calculate, construct, solve, analyse, compare).

SLO Cognitive Profile for Grade XI (Based on Bloom's Taxonomy)

The figures below describe the cognitive distribution of this grade's Student Learning Outcomes (curriculum intent and teaching guidance). They are distinct from the examination weightage, which is set as policy in the Table of Specification (Section 3.8).

Cognitive Level	Approximate Weightage	Description of Assessed Abilities
Knowledge (K)	5%	Recalling formulae, definitions and terminology (e.g., types of matrices, sampling methods, index number concepts).
Comprehension/ Understanding (U)	25%	Explaining concepts and interpreting results (e.g., differentiating nominal and effective rates, interpreting standard deviation as business risk).
Application, Analysis & Higher Order (A+)	70%	Highest weightage. Applying formulae and constructing models to solve business problems (e.g., solving equation systems, computing statistical measures, building spreadsheet models, calculating probabilities).
Total	100%	

Domain-Wise Weightage Table for Grade XII

Sr. No.	Domain Title	No. of SLOs	Depth/ Cognitive Demand of SLOs	Weightage (%)	Justification
1.	A: Analytical Thinking & Numerical Reasoning	3	High	11%	Quadratic modelling and graphical linear programming, the culminating optimization applications of the Grade XI algebraic foundation.
2.	B: Business Finance & Mathematics of Investment	5	High	18%	Conceptually demanding financial mathematics. Annuities, EMI and loan repayment schedules, sinking funds, payback/net-present-value comparison and savings certificate returns.
3.	C: Descriptive Statistics & Data Presentation	5	High	18%	Advanced descriptive statistics: quartiles, coefficient of variation, outliers, distribution shape, box plots and ogives used to compare business performance.
4.	D: Computational Thinking & Digital Tools	3	High	11%	Financial and lookup functions, data management, and spreadsheet-verified correlation

					and regression supporting work across the other domains.
5.	E: Counting Techniques, Correlation, Regression & Probability	5	High	18%	Regression and forecasting, rank correlation, conditional probability and binomial probability applied to inventory, staffing, quality control and sales scenarios.
6.	F: Business Optimization & Advanced Modeling	3	High	10%	Introductory differential calculus: the derivative, marginal analysis and profit maximisation.
7.	G: Index Numbers, Sampling & Inferential Statistics	4	Medium	14%	Index numbers (Laspeyre, Paasche and Fisher), sampling distribution, confidence intervals, and hypothesis testing with Type I and Type II errors.
	Total for Grade XII	28		100%	

SLO Cognitive Profile for Grade XII (Based on Bloom's Taxonomy)

The figures below describe the cognitive distribution of this grade's Student Learning Outcomes (curriculum intent and teaching guidance). They are distinct from the examination weightage, which is set as policy in the Table of Specification (Section 3.8).

Cognitive Level	Approximate Weightage	Description of Assessed Abilities
Knowledge (K)	9%	Recalling formulae and specific procedures for advanced topics (e.g., annuity formulae, hypothesis testing steps).
Comprehension/Understanding (U)	25%	Explaining the rationale behind quantitative methods (e.g., limitations of extrapolation, Type I versus Type II errors).
Application, Analysis & Higher Order (A+)	66%	Highest weightage. Synthesizing information to solve multi-step problems (e.g., loan repayment schedules, regression forecasts, profit maximisation using derivatives, hypothesis testing) and justifying business recommendations.
Total	100%	

The Examination

The examination for each grade comprises of total **50 marks** with a **Theory paper (40 marks – 80% of total)** along with a **Project-Based Assessment (10 marks – 20% of total)** involving at least one term-long integrated project and its exhibition/presentation at the end of the year. The combined weight of the two grades is 100 marks: 50 marks for Grade XI and 50 marks for Grade XII.

The Project Journal will be developed by Sindh Textbook Board in collaboration of Secondary and Intermediate Boards and subject experts. The project will be either selected from project journal or assigned by the subject teacher. Each assigned project should be in line with performance-based Learning outcomes (like using spreadsheets to calculate business outcomes).

Grade	Component	Paper & Marks	Duration	Structure & Breakdown
XI and XII	1. Theory	Paper I: 40 Marks	2 Hours	Sec I (8 marks): 8 compulsory MCQs of one mark each. This may include MCQs of various types to evaluate abilities and skills as detailed in the assessment scheme (from knowledge, understanding, application and beyond). Sec II (16 marks): It should contain up to eight Restricted response questions (RRQs) of 2-4 marks each to provide entire syllabus coverage, including short numerical problems, the choice may be given within question (eq: either attempt (a) or (b)). To be answered within the limited space provided in the answer Booklet. Sec III (16 marks): Student will attempt two Extended-Response Questions (ERQs) of 8 marks each out of three, the choice may also be given within question (eq: either attempt (a) or (b)), consisting of multi-step numerical problems with interpretation of results.
XI	2. Project (PBA)	Long Term Project & Exhibition: 10 Marks	Flexible	At least one compulsory integrated project assigned by teacher or selected from Project Journal. (e.g., a statistical survey of a local Sindh market, questionnaire design, data collection, frequency tables, charts and interpretation, or a spreadsheet-based break-even model for a small local business such as a stationery shop or tailoring service.)
XII	2. Project (PBA)	Long Term Project & Exhibition: 10 Marks	Flexible	At least one compulsory integrated project assigned by teacher or selected from Project Journal focusing on higher-order skills (analysis and decision-making). (e.g., comparing two investment options using payback period and net present value in a spreadsheet model, or conducting a hypothesis test on quality-control or customer survey data and presenting the conclusion.)

3.8 Table of Specification

This Table of Specification is the examination blueprint for the 40-mark theory paper. Each cell shows the number of Multiple-Choice, Restricted-Response, Extended-Response questions (MCQ, RRQ, ERQ) drawn from a domain at a cognitive level. Marks are derivable at 1, 2 and 8 marks respectively, and the totals (8 MCQs, 8 RRQs, 2 ERQs) follow the Scheme of Assessment (Section 3.7). The cognitive distribution is a policy specification set for content validity at Knowledge 20%, Comprehension 30% and Application/Higher-Order 50%, the same for both grades. This is deliberately separate from the SLO Cognitive Profile (Section 3.7) and the cognitive tags on individual SLOs, which express curriculum intent; a one-to-one mapping between the SLO tags and the paper's items is neither required nor intended.

Table of Specification (Grade XI)

Domain	No. of SLOs	K			U			A+			Marks	Percentage %
		MCQ	RRQ	ERQ	MCQ	RRQ	ERQ	MCQ	RRQ	ERQ		
A	5	1	-	-	1	1	-	-	1	-	6	15%
B	4	1	-	-	-	1	-	-	1	-	5	12.5%
C	5	1	1	-	-	-	-	-	-	1	11	7.5% *
D	3	1	-	-	1	1	-	-	-	-	4	10%
E	6	1	-	-	1	-	-	-	-	1	10	25%
F	5	-	-	-	-	1	-	-	-	1	10	25%
G	2	1	-	-	1	-	-	-	-	-	2	5%
Total	30	6	1	-	4	4	-	-	2	2+1*	40	
Marks by level		6x1+1x2=8			4x1+4x2=12			2x2+8x2=20 *One ERQ Choice			40	
Percentage		20%			30%			50%				100%

Table of Specification (Grade XII)

Domain	No. of SLOs	K			U			A+			Marks	Percentage %
		MCQ	RRQ	ERQ	MCQ	RRQ	ERQ	MCQ	RRQ	ERQ		
A	3	1	-	-	-	1	-	-	-	-	3	7.5%
B	5	-	-	-	-	1	-	-	1	1	12	30%
C	5	1	-	-	1	1	-	-	-	1	12	30%
D	3	1	-	-	1	1	-	-	-	-	4	10%
E	5	1	-	-	-	-	-	-	-	1	9	2.5% *
F	3	1	1	-	-	-	-	-	-	-	3	7.5%
G	4	1	-	-	-	1	-	-	1	-	5	12.5%
Total	28	6	1	-	2	5	-	-	2+2*	2+1*	40	
Marks by level		6x1+1x2=8			2x1+5x2=12			2x2+8x2=20 *One ERQ Choice				
Percentage		20%			30%			50%				100%

*Section III offers one choice: in addition to the two compulsory extended-response questions, an optional third ERQ may be offered as an alternative (candidates attempt any two of the three). The optional question does not change the 40-mark total.

Note on Project-Based Assessment: SLOs flagged as **PBA** in the progression grid, namely the spreadsheet-software outcomes of Domain D and the data-collection outcome BMS-11-C-01, assess competencies that cannot be reliably examined on a written paper. They are assessed through the 20% Project-Based Assessment; the theory paper may still test their conceptual knowledge.

Section wise Marks distribution of Theory Paper:

SECTION 'A' (MULTIPLE CHOICE QUESTIONS- MCQ'S)- 8 MARKS (8 x 1)

SECTION 'B' (RESTRICTED-RESPONSE QUESTIONS – RRQ)- 16 MARKS (up to 8x2)

SECTION 'C' (EXTENDED-RESPONSE QUESTIONS – ERQ)- 16 MARKS (2 x 8)

4. Teaching and Learning Strategies

This curriculum endorses a student-centred philosophy and aligned with the principles of modern assessment. The primary objective is to facilitate a shift from the passive transmission of information to the active construction of knowledge, mirroring the assessment focus on deep comprehension and application over rote memorization.

Instruction must be designed to cultivate the competencies outlined in this curriculum, preparing students to think critically, solve problems and collaborate. The teacher's role evolves from that of a knowledge dispenser to a facilitator of learning, a guide who engineers an environment where inquiry, exploration and authentic engagement thrive. **Teachers and institutions are encouraged to continuously explore and build linkages with local businesses and institutions to create avenues for their students' hands on learning and project-based learning.** This approach ensures a direct connection between curriculum, instruction and assessment, rooting all learning in the rich cultural context of Sindh while preparing students for provincial, national and global challenges.

4.1 A Shift in Teaching and Learning methods

As assessment evolves beyond conventional testing methods, teaching must also move towards more genuine and captivating learning experiences. This paradigm shift moves the classroom from a teacher-centred model focused on content delivery to a learner-centred model focused on skill development and conceptual understanding. Instead of relying solely on lectures and textbook drills that prepare students for simple recall (MCQs, basic CRQs), instruction will prioritize real-world problems, hands-on projects and collaborative tasks. This shift is critical for developing the advanced capabilities such as critical analysis, innovation and teamwork that are measured by the performance-based, portfolio and authentic assessments already outlined. By making learning relevant and empowering, these instructional methods enhance student motivation and more accurately prepare them to demonstrate the full depth of their learning.

4.2 Core Instructional Approaches necessary for Assessment shift

To achieve the aims of this curriculum, our classrooms should become dynamic hubs of active learning, moving beyond simple instruction to create experiences that directly build the skills needed for modern assessment. This is accomplished through a blend of three core approaches.

1. Inquiry-Based and Problem-Based Learning (IBL & PBL)

The learning journey begins by placing a genuine problem or a compelling question at its heart. Through **IBL & PBL**, students become active investigators. Teachers act as facilitators, posing authentic problems and guiding students as they identify issues, formulate hypotheses, gather data and present evidence-based conclusions. This fosters critical thinking and problem-solving, directly preparing them to construct the arguments needed for sophisticated **Performance Tasks** and **Extended-Response Questions (ERQs)**.

2. Collaborative and Cooperative Learning

The above investigative process is rarely a solo journey. Learning becomes a vibrant, social activity through **Collaborative and Cooperative Learning**. By working in pairs and groups to explore concepts and solve problems, students develop essential 21st-century skills like communication, teamwork and leadership. This collaborative spirit fosters a culture where giving and receiving constructive feedback is normal, directly preparing students for **Peer Assessment** and providing teachers with rich opportunities for **Observation-based** evaluation.

3. STEAM (Science, Technology, Engineering, Arts and Mathematics) Integration

Ultimately, this collaborative inquiry can culminate in the exciting, interdisciplinary world of **STEAM integration**. This approach breaks down the traditional walls between the disciplines, fostering 21st century

skills, promoting holistic learning and enhancing engagement, challenging students to apply knowledge from multiple fields to design, create and innovate. These projects are more than just assignments; they are a form of **Authentic Assessment** in themselves. The innovative models, creative designs and powerful presentations produced serve as ideal artifacts for **Portfolios**, showcasing a depth of understanding that is effectively evaluated using **Performance-Based Assessments** and **Scoring Rubrics**.

4.3 Instructional Strategies and Their Role in Assessment

Within these core approaches, a diverse range of strategies can be used to cater to different learning goals and prepare students for specific assessment formats.

Strategy	Description	Alignment with Assessment
Interactive Lecturing	Combines direct instruction with embedded activities like Q&A sessions, quick polls and “turn-and-talk” discussions to ensure active engagement.	Builds foundational knowledge and comprehension, preparing students for MCQs and Constructed-Response Questions (CRQs) while providing formative feedback.
Demonstrations	Teacher-led or student-led demonstrations of concepts or processes that make abstract ideas concrete and stimulate critical thinking.	Prepares students for Practical/ Performance Assessments by modeling procedures and skills that will be evaluated. Supports Observation-based assessment.
Differentiated Instruction	Tailoring content, processes and products to accommodate the diverse learning needs, interests and readiness levels of each student.	Ensures equity in learning, a core principle of the assessment philosophy. Allows all students a fair opportunity to meet learning outcomes measured by varied assessments.
Concept Mapping & Visual Tools	Students visually organise concepts and show relationships, helping them structure thinking and make connections between complex information.	Develops analytical skills needed for ERQs and Performance Tasks. The maps themselves can be assessed as part of a Portfolio to show conceptual growth.
Use of Technology & Digital Resources	Integrating digital tools, simulations, virtual labs and multimedia enhances understanding, conducts research and presents findings creatively.	Supports the creation of diverse evidence for Portfolios. Develops digital literacy skills often required in modern Performance Tasks.
Role-Playing & Simulations	Students act out scenarios or engage in simulations to explore different viewpoints and practice skills in safe, real-world contexts.	A powerful form of Authentic Assessment that allows teachers to observe and evaluate decision-making, communication and application of knowledge in real-time.

4.4 Enriching the Learning Environment: Resources for Authentic Instruction

While the approved textbook is a primary resource, it is not the sole tool for instruction. To implement the authentic and inquiry-based approaches described above, teachers must utilize a wide range of learning

resources to create a rich and stimulating environment. These resources are not merely supplementary, they are essential for preparing students for modern assessment.

Digital and Online Resources: Educational websites, simulations, videos and interactive platforms provide dynamic content for inquiry-based learning and project work.

Reference Materials: Books, journals and other print media encourage deeper research and support the development of arguments required in ERQs and reports.

Community Resources: Educational tours (e.g., to industries, financial institutions) and guest speakers from professional fields provide an authentic, real-world context that bridges classroom learning with the skills evaluated in performance-based assessments.

5. Guidelines for textbook and learning materials development

This curriculum calls for a fundamental shift from passive information intake to the active creation of knowledge, positioning the textbook as the catalyst for this transformation. The textbook's role moves beyond delivering facts, it is meant to spark curiosity, foster critical thinking and nurture intellectual independence. To realize this vision, the textbook must serve as the foundation of a comprehensive learning package. This package must include a mandatory Teacher's Guide and a Practical/Project Manual, both enhanced with digital resources, to connect educational philosophy with practical classroom application. Altogether, this system guarantees that every student's learning experience is active, engaging, ethically grounded and deeply relevant to life in Sindh.

5.1 Prerequisites for Authors and Development Teams

The creation of learning materials according to these guidelines requires a shift from traditional content writing to modern pedagogical design. Subject matter expertise alone is insufficient. All prospective authors, illustrators and editors must complete a mandatory training by the STBB and DCAR to achieve this highly technical goal of translating these guidelines into practice, including instructional design, developing higher-order thinking questions, creating concept maps and integrating formative assessment. Only certified individuals and teams will be eligible to develop textbooks for this curriculum.

5.2 Core Principles of Content Development

The foundation of all content is strong accuracy and authenticity. All information, including facts, theories and data, must be meticulously fact-checked to be up-to-date and free from error, reflecting recent developments in the field.

Building upon this foundation, the content must be structured with pedagogical precision. Every Student Learning Outcome (SLO) must be addressed at its prescribed cognitive level, while the concepts content itself flows logically from simple to complex and from concrete to abstract. This structure must demonstrate clear vertical continuity with previous grades and horizontal coherence across subjects, ensuring a seamless learning journey free from unnecessary overlap.

To be truly meaningful, this well-structured and accurate content must connect directly to the student's world. Authors are required to prioritize examples, applications, case studies and problems drawn from the local environment and daily life in Sindh and Pakistan. This contextual relevance is interwoven with a firm commitment to the ethical and social values outlined in this curriculum, including integrity, respect for diversity and gender equality, while strictly adhering to copyright law. To further enrich this learning experience, authors will infuse approved concepts from other key curriculum frameworks, such as DRR, LSBE and AI, as directed by the Government of Sindh.

5.3 The Textbook: Structure and features

Each chapter must be structured as an engaging and effective learning journey, incorporating modern pedagogical features. The following structure should be adapted for each chapter:

A. Chapter Opening:

The opening of each chapter must immediately capture the student's interest by using compelling titles, high-quality visuals and thought-provoking "trigger questions" to spark their curiosity. This initial engagement is immediately followed by a clear articulation of the chapter's Student Learning Outcomes (SLOs), providing a transparent roadmap for students, teachers and assessors. Finally, the learning is grounded in a concise introduction that establishes the topic's real-world relevance to society, technology and daily life, in line with STEAM principles.

B. Chapter Body:

As students navigate the chapter's content, they are guided by a clear hierarchy of color-coded headings and typographic cues, such as bolded key terms and italicized concepts. Immediate comprehension is supported by placing definitions in the margins at their first appearance. The learning experience is deepened through a variety of interactive elements such as **feature boxes** for important formulas, laws, or theorems; **Tidbits / Did You Know?** for interesting facts; **Points to Ponder** to encourage deeper, critical reflection along with a rich variety of high-quality, purposeful visuals, including diagrams, charts, infographics and contextually relevant photographs.

To ensure active engagement and retention, embed "**Self-Test**" or "**Checkpoint**" questions after major sections to allow students to pause and assess their understanding before moving on. Actively link new concepts to previous learning from earlier chapters or grades through explicit call-out boxes or notes.

Integration of supplementary digital tools and resources (such as QR codes linking to videos or simulations) is encouraged. However, these resources are considered **supplementary enhancements and must not be essential for achieving the core SLOs**. To ensure equity for students without digital access, for every digital resource provided, a non-digital alternative or a detailed description of its content and learning objective must be included in the Teacher's Guide.

C. Chapter Ending:

The chapter's conclusion is designed to consolidate and assess learning in two distinct phases. Conclude the with a bullet-point summary that reviews the main concepts, directly relating back to the chapter's SLOs, followed by a **concept map** that visually illustrates the relationships between the key ideas.

Following this, the assessment section provides a comprehensive evaluation of student learning, with a strict emphasis on higher-order thinking skills. The exercise must include:

1. **Multiple Choice Questions (MCQs):** Including reasoning-based and multi-select questions.
2. **Constructed Response Questions (CRQs):** Short-answer questions requiring explanations.
3. **Extended Response Questions (ERQs):** Longer questions requiring analysis, evaluation, or detailed problem-solving.
4. **Numerical and Practical Problems including project ideas:** Application-based questions reflecting real-world scenarios and including project ideas are encouraged where possible.

Assessment must follow a principle of progressive difficulty and be explicitly aligned with the chapter's SLOs. Finally, to support student autonomy, solutions for numerical problems are required at the end of the book.

D. End-of-Textbook Reference Materials

The end of the textbook should provide comprehensive support resources for both students and teachers, ensuring the book is a complete learning package.

Component	Description and Guidelines
Appendices	Include supplementary information essential for the student's work but not required within the main text. This may include Lists of key formulas or equations, DATA tables (e.g., log tables, periodic table, constants) and relevant charts or detailed technical diagrams.
Answers to Problems	Provide answers to all numerical and objective-type questions from the end-of-chapter exercises on a unit-wise basis. This allows students to self-assess their work and check for correctness.
Comprehensive Glossary	A complete alphabetical list of all key terms used throughout the textbook with their clear, concise definitions. This goes beyond the in-chapter "Running Glossary" and serves as a master reference.
Bibliography and Suggested Reading	A formal list of all sources cited in the textbook. Additionally, provide a curated list of high-quality, accessible books and relevant, verified websites for students and teachers who wish to explore topics further.
Comprehensive Index	An alphabetical index of all key terms, concepts and important names used in the book, with corresponding page numbers for easy navigation and reference.

5.4 Guidelines for Illustrations, Layout and Design

Visual design is critical to a textbook's effectiveness. Illustrators and designers must work in close collaboration with authors to ensure all visual elements serve a clear pedagogical purpose.

Purpose over Decoration: Every illustration must be functional, it should clarify a concept, illustrate a process, or provide essential context. Avoid generic or decorative images.

Clarity and Accuracy: Diagrams and charts must be clear, simple and accurately labeled with appropriate SI units where applicable. All visuals must have concise, descriptive captions.

Inclusivity and Authenticity: Visuals must reflect the diversity of Pakistani society (including gender, culture and ability) and be free of stereotypes. Authentic, local imagery is strongly preferred.

Professional Layout: The page layout must be clean, modern and readable, with ample white space. Typography must be consistent and legible.

5.5 Mandatory Supplementary Materials

A. The Teacher's Guide

To ensure the successful implementation of the curriculum, every textbook must be the part of a complete learning package. The Teacher's Guide is the single most critical tool for ensuring the successful implementation of this curriculum. It is **not an optional supplement but a mandatory, core component** of the learning package. It must be developed concurrently with the student textbook, not as an afterthought and will be given equal priority, timeline and resources during the development and review process. The quality of the Teacher's Guide will be a primary criterion for the approval of the entire textbook package.

Its purpose is to serve as a professional guide that empowers teachers to shift from traditional instruction to the active, inquiry-based facilitation required by this curriculum. To this end, it must include the following components for each chapter:

Chapter-wise Pedagogical Guidance:

A clear mapping of the chapter's content to the specific Student Learning Outcomes (SLOs), benchmarks and competencies. Suggested, flexible lesson plans that cover learning objectives, estimated timings and a list of required materials (with an emphasis on low-cost, locally available resources). Detailed, easy-to-follow instructions for implementing the core instructional approaches, such as facilitating inquiry-based projects, managing collaborative group work and guiding STEAM activities.

Practical tips, guiding questions to ask students to promote higher-order thinking and strategies for addressing common student misconceptions. Concrete strategies for supporting struggling learners and challenging advanced students within the same lesson.

Comprehensive Assessment Support:

Clear guidance on when and how to conduct formative assessment during lessons, including what to look for during observations and how to use "Self-Test" questions effectively with detailed marking schemes and scoring rubrics for all end-of-chapter Constructed-Response Questions (CRQs), Extended-Response Questions (ERQs) and performance tasks. This is essential for ensuring consistent and fair evaluation of higher-order skills. A complete solutions key with clear, worked-out answers for all numerical problems and objective questions.

Content and Resource Support:

Concise background information on complex topics to enhance the teacher's own subject matter mastery. For every digital resource (e.g., QR code) mentioned in the student textbook, the Teacher's Guide must provide a detailed description of its content and a viable non-digital alternative activity to ensure equity for all students.

B. Practical / Project Manual:

To fully realize the curriculum's paradigm shift from passive learning to active knowledge construction, a separate **Practical / Project Journal/Manual** must be developed for subjects where hands-on application is central to learning. This manual is not envisioned as a traditional "practical notebook" of prescribed, step-by-step procedures. Instead, it is a critical tool designed to facilitate the hands-on, inquiry-based and problem-solving activities that are central to developing higher-order learning.

Purpose and Philosophy:

The primary purpose of the Project Manual is to serve as the bridge between the conceptual knowledge presented in the textbook and its application in authentic, real-world contexts. It is the space where students engage in the *process* of learning by investigating, designing, creating and reflecting. Every task within this manual must be designed to cultivate the competencies outlined in this curriculum, such as critical thinking, collaboration, creativity and communication.

Core Components and Structure:

The manual should be structured to correspond with the chapters or units of the student textbook. For each major topic, it should provide tasks that may include:

Open-ended problems that require students to apply principles from any other disciplines including Science, Technology, Engineering, Arts and Mathematics to design, build and test a solution for a specific, often local, problem.

Real-world scenarios from local, national, or global contexts that require students to analyse complex situations, evaluate different perspectives and propose justified solutions or courses of action.

Extended projects that guide students through the process of conducting research on a topic of interest, gathering information from multiple sources, synthesizing their findings and presenting their work in a

formal manner.

Essential Features for Implementation:

To be effective, the Practical / Project Manual must include:

Templates and organisers to help students structure their work, such as project proposal forms, data collection tables and guides for writing a formal report or reflection.

Each major task must be accompanied by a clear scoring rubric or checklist, enabling students to understand the expectations for success and facilitating fair and consistent teacher evaluation. This also provides a direct tool for **Self and Peer Assessment**.

The tasks in this manual are designed to generate the primary evidence for **Performance-Based Assessments** and to produce the key artifacts that will be included in student **Portfolios**.

Some tasks should be explicitly designed for group work, with clear guidelines on roles, responsibilities and collaborative processes.

For any activity involving hands-on materials or equipment, clear, comprehensive safety guidelines must be provided.

6. Continuous Professional Development (CPD)

The success of this curriculum does not depend on the quality of this document alone, but on the capacity of our teachers to bring its vision to life. The paradigm shift from passive instruction to active, inquiry-based learning requires a profound transformation in professional practice. Therefore, Continuous Professional Development (CPD) is not an optional add-on but the central engine for implementing this curriculum.

The primary purpose of this CPD framework is to bridge the gap between the curriculum's ambitious vision and the daily realities of the classroom. It is designed to empower every teacher with the pedagogical skills, assessment literacy and confidence needed to move from a "knowledge dispenser" to a "facilitator of learning." This framework is a commitment to investing in our teachers as the primary agents of educational change.

6.1 Guiding Principles of the CPD Framework

All professional development activities under this curriculum will be guided by the following principles:

- Every CPD module and activity must be directly and explicitly linked to the curriculum's core components: the Student Learning Outcomes (SLOs), the inquiry-based teaching strategies, the authentic assessment methods and the pedagogical features of the new textbooks.
- CPD will prioritize hands-on, experiential learning over theoretical lectures. Teachers will engage in the same collaborative, problem-based activities they are expected to facilitate with their students.
- One-off workshops are insufficient. The CPD model is designed as a continuous, cumulative journey of learning, practice, reflection and refinement, integrated into the teacher's professional life.
- The ultimate goal of all CPD is to build the capacity of teachers to engineer learning environments that foster critical thinking, collaboration and creativity, as outlined in the "Teaching and Learning Strategies" section.

- All training will be adapted to the diverse realities of Sindh's schools, providing strategies for both high-resource and low-resource environments.
- Teachers must be trained on the *concepts* of spreadsheet modelling and statistical analysis, not just how to use one specific software.

6.2 Core Components of the CPD Framework

The CPD program is structured around five interconnected components, ensuring a holistic approach to professional growth.

Component	Purpose	Key Activities & Strategies
1. Deconstructing the Curriculum	To ensure teachers deeply understand the philosophy, structure and expectations of the new curriculum.	• Interactive sessions on the "Paradigm Shift" in teaching and assessment. • Workshops on unpacking SLOs and aligning them with cognitive levels. • Collaborative mapping of vertical and horizontal curriculum linkages.
2. Mastering Authentic Pedagogy	To equip teachers with the practical skills to implement the core instructional approaches.	• Experiential workshops where teachers engage in Inquiry-Based, Problem-Based and STEAM projects as learners. • Micro-teaching sessions to practice facilitating collaborative learning. • Developing and sharing lesson plans that integrate the strategies from the curriculum.
3. Implementing Modern Assessment	To build teacher competency in designing, administering and interpreting a variety of authentic assessments.	• Hands-on training to create and use scoring rubrics, checklists and rating scales. • Collaborative sessions to design Performance Tasks and ERQs aligned with SLOs. • Workshops on building and evaluating student portfolios and providing effective formative feedback.
4. Leveraging the New Textbook and Teacher's Guide	To ensure teachers can effectively use the new learning materials as catalysts for active learning.	• Practical training on using the textbook's pedagogical features (trigger questions, concept maps, tiered exercises). • Mandatory sessions on using the Teacher's Guide to plan lessons, differentiate instruction and implement activities. • Guidance on supplementing the textbook with low-cost, locally available resources.

5. Building a Community of Practice	To foster a sustainable culture of collaboration, peer support and continuous improvement.	- Establishing school-based or cluster-based Professional Learning Communities (PLCs). - Implementing structured peer observation and feedback cycles. - Creating online forums for teachers to share resources, challenges and successes.
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6.3 Implementation Model

To ensure manageable and effective implementation, the CPD rollout will follow a phased approach:

Phase 1: Foundation and Awareness: Focus on building a deep understanding of the curriculum's "paradigm shift." All teachers will be trained on the core philosophies of teaching and assessment and how to navigate the new textbooks and Teacher's Guides. The goal is universal awareness and buy-in.

Phase 2: Deep Implementation and Coaching: Focus on intensive, hands-on practice. This phase will involve subject-specific training, in-school coaching and peer-learning support to help teachers master the core pedagogical and assessment strategies in their own classrooms.

Phase 3: Innovation and Leadership (Ongoing): Focus on sustainability. This phase will identify and train a cadre of Master Teachers and school-based instructional leaders who can provide ongoing, localized CPD support to their colleagues, ensuring the system continues to grow and adapt.

6.4 Proposed Roles and Responsibilities

The success of the entire curriculum hinges on success of this phased approach of CPD, this will serve as foundation but a detailed rollout plan with clear funding, timelines, and accountability is essential.

College Education Department / School Education & Literacy Department, Government of Sindh (Collaboration with Relevant attached departments): To provide strategic direction, allocate dedicated funding for CPD and establish a robust certification and monitoring system.

Teachers: To be active and committed participants in their own professional growth, willing to experiment with new strategies, reflect on their practice and collaborate with their peers.

6.5 Monitoring and Impact Evaluation

The success of the CPD program will be measured not by the number of workshops conducted, but by its observable impact on classroom practice and student learning.

Classroom Observation Data: To track the shift from teacher-led lectures to student-centered, inquiry-based activities.

Analysis of Teacher-Developed Materials: To evaluate the quality of lesson plans, assessment tasks and rubrics created by teachers.

Analysis of Student Work: To assess the quality and depth of thinking demonstrated in student portfolios, projects and ERQs as a direct outcome of improved instruction.

Teacher and Student Feedback: To gather qualitative data on the effectiveness of the training and its impact on classroom engagement and motivation.

7. Educational Resources

To bring this curriculum to life, move beyond the textbook. A blend of digital, physical and human resources is essential to create the dynamic, real-world learning experiences we envision.

Technology & Digital Tools: Use technology for more than just drills. It brings business mathematics and statistics to life.

- **Model Real Business Problems:** Use spreadsheets (Excel, Google Sheets) to build cost-revenue and break-even models, prepare loan repayment schedules, compute statistical measures and generate charts. This provides risk-free practice and directly serves the SLOs of Domain D.
- **Access Expertise:** Platforms like Khan Academy offer tutorials on specific topics (e.g., "Compound Interest," "Correlation and Regression," "Probability"), perfect for flipped classrooms or student self-paced review.
- **Analyse Real Data:** Download price and inflation data from the Pakistan Bureau of Statistics, exchange and profit rates from the State Bank of Pakistan, and share price series of Sindh-based companies from the PSX website for students to analyse, connecting index numbers, averages and trends to the live local and national economy.
- **Guideline:** Always pair digital tasks with a non-digital alternative to ensure equity. The focus is on understanding the concept, not just mastering the tool. Scientific calculators and manual computation remain fully acceptable pathways to every outcome.

Educational Tours: Transform theory into tangible experience by visiting the engine of the Sindh economy.

- **Process:** Align the visit with a curriculum topic (e.g., a bank branch for interest and loan calculations, a wholesale market for price data collection, a manufacturing unit for quality control sampling). Secure permissions and prepare students with a focused task sheet.
- **Student Task:** Their goal is to investigate and collect data. "What profit rates are offered on deposits?" "How do prices vary across stalls for the same item?" "How is defective output recorded?" The subsequent statistical analysis and report become a key performance assessment.

Guest Speakers: Connect the classroom to the profession.

- **Bring Role Models:** Invite bank managers, financial analysts, statisticians, insurance and microfinance officers and data analysts from local businesses, making a conscious effort to include both men and women to inspire all students.
- **Format:** A session, in-person or virtual, followed by Q&A. Ask the speaker to focus on a real-world problem they solved with numbers, a loan decision, a market forecast, a quality issue, or how spreadsheet and data tools have changed their day-to-day work.

Libraries & Reading: Cultivate the critical thinking that underpins sound quantitative reasoning.

- **Go Beyond Textbooks:** Curate a collection that includes business biographies, case studies of Pakistani companies and accessible books on data, statistics and financial literacy.
- **Active Reading:** Integrate this into learning through reviews of business news articles containing figures and charts, critiques of misleading graphs and research into the price history of everyday goods. Great readers become discerning analysts.

Provincial Review Committee (PRC) for Commerce Group Curricula

No	Name of the Expert
1	Dr. Jawed Ahmed Chandio, Professor & Dean, Faculty of Commerce & Business Administration, University of Sindh, Jamshoro.
2	Dr. Hakim Ali Mahesar, Professor and Director, Institute of Commerce, University of Sindh
3	Dr. Sadia Anwar, Associate Professor, Institute of Commerce, University of Sindh, Jamshoro.
4	Dr. Huma Shahid, Professor, Iqra University Karachi
5	Mr. Noor Ahmed Khoso, Directorate of Curriculum, Assessment and Research Sindh, Jamshoro
6	Mr. Muhammad Aslam, Principal, Government Degree Boys College Yousuf Goth Surjani Town
7	Mr. Faraz Siddiqui, Associate Professor, Government College of Commerce and Economics, Karachi
8	Mr. Muhammad Ismail Ansari, Assistant Professor, Government Elementary College of Education (W), Thatta
9	Mr. Imtiaz Ali Kumbhar, Associate Professor, Government Elementary College of Education, Lyari, Karachi
10	Ms. Habiba Aliya, Associate Professor, Shaheed-e-Millat Government Degree College for Women, Azizabad, Karachi
11	Mr. Abdul Qadir, Assistant Professor, Government Degree Boys College, Surjani Town, Karachi
12	Mr. Shahzad Saleem, Assistant Professor, APWA Govt Degree college for Women, Karimabad, Karachi.
13	Ms. S Nudrat Ameer, Assistant Professor, Government Degree Science and Commerce College FB Area block 16 Karachi
14	Mr. Abbas Ali Shah, Lecturer, Government Degree College, Razzakabad, Karachi
15	Mr. Alexander Ismat, Deputy Principal, Ziauddin College of Intermediate and A-Levels, Karachi
16	Mr. Saddam Hussain, J.S.S Commerce, STBB Jamshoro.
17	Mr. Muhammad Yousif Channa, Associate Professor, Government Elementary College of Education, Badin



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

Karachi, dated the 24th, July, 2026.

NOTIFICATION

NO. SELD/HCW/18/2018: In compliance with the Section 3, sub-section (4), (e) of Sindh School Education Standards & Curriculum Act 2014, Sindh Act No. IX of 2015. School Education & Literacy Department, Government of Sindh is pleased to accord **No Objection Certificate** for approval of (a) **Business Mathematics and Statistics grade XI-XII**, (b) **Principles of Commerce-II (Banking) for grade XII** and (c) **Commercial Geography for XII**, after review by the Provincial Review Committee for Commerce Group.

(ZAHID ALI ABBASI)
SECRETARY TO GOVERNMENT OF SINDH

NO. SELD/HCW/18/2018:

Karachi, dated the 24th, July 2026.

A copy for information and necessary action to:

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



✓ SECTION OFFICER (CURRICULUM)
For SECRETARY TO GOVERNMENT OF SINDH.