SMART TRAINERS

LESSON PLAN FOR

QUANTITY SURVEYING & COST ESTIMATION COURSE

COURSE TITLE:	**Basic to Intermediate QS & Cost Estimation**
COURSE CODE:	**QSE 001**
CREDIT HOURS:	**02**
DURATION:	**08 Weeks (03 Classes Each Week)**

COURSE INSTRUCTOR:	**Batch:**	**Course Starting Date:**	**Course Suspension Date:**

COURSE LEARNING OUTCOMES: Upon successful completion of the course, the student will be able to: Understand the fundamental role of a Quantity Surveyor in the construction industry and apply standard measurement rules and units to real-world projects. Read and interpret architectural and structural drawings to extract accurate quantities for all trades including earthwork, concrete, masonry, finishes, steel, and MEP works. Prepare detailed Bills of Quantities (BoQ) for residential and commercial projects in accordance with standard methods of measurement (SMM7, FIDIC, PAIQS). Apply current market rates, labour constants, wastage factors, and overhead calculations to produce comprehensive cost estimates and abstracts. Use Microsoft Excel and dedicated QS software (CostX / QS Pro) to produce digital take-offs, cost plans, and automated BoQ reports. Prepare tender documents, comparative bid analysis statements, and payment certificates for construction contracts. Understand contract administration basics — variations, claims, final accounts, and value engineering — and produce complete project cost reports.

LESSON CONTENTS AND ASSOCIATED CLO(s)

CLO	Description	Level
01	Understand the QS profession and its role in construction; apply standard units, measurement rules, and read architectural and structural drawings for quantity extraction.	**C1**
02	Prepare detailed quantity take-offs for all major building trades: earthwork, substructure, concrete, masonry, steel, timber, roofing, and finishes.	**C2**
03	Compile Bills of Quantities (BoQ) following SMM7 / FIDIC / PAIQS standards; apply market rates, labour constants, wastage, and overheads to produce cost abstracts.	**C3**
04	Use Microsoft Excel and QS software (CostX / QS Pro) for digital take-offs, cost plans, and automated BoQ report generation.	**C3**
05	Prepare tender documents, evaluate contractor bids, produce comparative analysis statements, and issue interim payment certificates.	**C4**
06	Administer construction contracts: assess variations and claims, prepare final accounts, apply value engineering principles, and produce comprehensive project cost reports.	**C4**

Contents	Week	CLO No.	Marks Assigned	Delivery Methods	Assessment Methods
PHASE 1 — BASIC QS & ESTIMATION (Weeks 1 – 4)					
1. Introduction to Quantity Surveying • Role of the Quantity Surveyor in the construction industry • Types of estimates: conceptual, preliminary, detailed, and tender • Key QS documents: BoQ, cost plan, schedule of rates, abstract • Standard methods of measurement: SMM7, FIDIC, PAIQS overview • Units of measurement: linear (m), area (m2), volume (m3), weight (kg/ton) • Professional bodies: RICS, AIQS, PAIQS, and ethical standards **2. Drawing Reading & Interpretation** • Types of construction drawings: architectural, structural, MEP • Reading floor plans, elevations, sections, and detail drawings • Understanding scales: 1:50, 1:100, 1:200 — manual and digital scaling • Identifying elements: walls, slabs, columns, beams, openings • Abbreviations, symbols, and notation used in construction drawings • Cross-referencing between drawing sheets and specifications **3. Earthwork & Site Preparation Quantities** • Site clearance: area calculations and vegetation removal • Excavation for foundations: strip, pad, raft, and basement types • Calculating cut and fill volumes using Average End Area method • Backfilling, compaction, and disposal of surplus soil • Anti-termite treatment and hardcore filling quantities • Practical exercise: excavation quantities for a 2-bedroom house	Week 1	01	5%	Online Lectures & Practical Work	Practical Project

4. Substructure — Foundations & Ground Slab • Strip foundation concrete: volume calculation (L x W x D) • Reinforcement in foundations: bar bending schedule basics • Damp-proof course (DPC): area and linear measurement • Ground beam concrete and reinforcement quantities • Ground floor slab: concrete, mesh reinforcement, and blinding • Hardcore, sand blinding, and DPM membrane take-off **5. Superstructure — Concrete & Reinforcement** • Columns: concrete volume and formwork area calculations • Beams: rectangular and T-beam concrete and formwork take-off • Suspended slabs: solid, ribbed, hollow-block slab quantities • Staircases: waist slab, steps, and landing concrete volumes • Bar bending schedule (BBS): shapes, hooks, laps, and cutting length • Reinforcement summary table: weight calculation (kg and ton) **6. Masonry & Blockwork** • Brick and block quantities: number of units per m2 • Deductions for openings: doors, windows, and vents • Mortar quantities: cement, sand ratios and volume per m3 • Cavity walls, honeycomb walls, and fair-face brickwork • Lintel and sill measurement: precast concrete and brick arches Practical exercise: external and internal wall take-off for a villa **7. Roofing, Waterproofing & Insulation** • Flat roof: screed, waterproofing membrane, and protective layer • Pitched roof: rafters, purlins, trusses — timber quantities in m3 • Roof covering: clay/concrete tiles, metal sheets, corrugated iron	Week 2	01–02	5%	Online Lectures & Practical Work	Practical Project

• Fascia boards, gutters, and downpipes: linear measurement • Thermal insulation and vapour barrier take-off • Waterproofing to wet areas: bathrooms, kitchens, balconies					
8. Finishes — Plastering, Tiling & Painting • Internal and external plastering: area and thickness calculations • Ceramic, porcelain, and marble floor tiling with wastage factors • Wall tiling to bathrooms and kitchens: net and gross areas • Screed and levelling compound quantities • Painting and decorating: primer, undercoat, and finish coats (m2) • False ceiling: gypsum board, metal framing, and suspension system	Week 4	02–03	10%	Online Lectures & Practical Work	Practical Project
PHASE 2 — INTERMEDIATE QS & ESTIMATION (Weeks 5 – 8)					
9. Doors, Windows, Steel & Metalwork • Door schedules: types, sizes, frames, ironmongery — nr (number) items • Window schedules: aluminium, uPVC, timber — glazing area calculation • Structural steelwork: I-sections, channels, angles — weight (kg/ton) • Steel connection plates, bolts, and welding quantities • Handrails, balustrades, and staircases in mild steel • Metal roofing purlins, cleats, and cladding take-off **10. MEP Services — Basic Quantities** • Plumbing: pipework (m), fittings (nr), fixtures (nr) • Sanitary ware schedule: WC, basin, bath, shower, sink • Electrical conduit runs (m) and cable tray (m) • Light points, power outlets, switches — nr items from drawing • HVAC: ductwork (m2), units (nr), and grille/diffuser schedule • Fire protection: sprinkler heads (nr) and pipework (m) **11. Rates, Abstracts & Cost Plan**	Week 4	02–03	10%	Online Lectures & Practical Work	Practical Project

- Building up unit rates: material + labour + plant + overhead + profit
- Labour constants and productivity norms for common trades
- Material wastage allowances: typical % for concrete, tiles, paint
- Schedule of rates vs. all-in rates vs. composite rates
- Preparing the cost abstract: collating take-off quantities with rates
- Elemental cost plan: BCIS elements and cost per m2 benchmarking

12. Digital Take-Off — Excel & QS Software

- Setting up a structured Excel workbook for quantity take-off
- Excel formulas for QS: SUMIF, VLOOKUP, pivot tables, named ranges
- Using CostX / QS Pro: importing drawings and digital measurement
- Area, length, and count tools in digital take-off software
- Generating automated BoQ reports and exporting to PDF/Excel

Linking dimensions to cost database and auto-pricing take-of

13. Bills of Quantities — Compilation & Presentation

- BoQ structure: preambles, preliminaries, measured works, PC sums
- Preliminary items: site management, insurance, bonds, mobilisation
- Provisional sums (PS) and prime cost (PC) sums — definitions and use
- Writing item descriptions to SMM7 / NRM2 standard
- Formatting and presenting a complete BoQ document
- Practical exercise: full BoQ for a 3-bedroom residential unit

14. Tendering, Bid Analysis & Payment Certificates

• Tender documentation: instruction to tenderers, conditions, drawings • Sending and receiving tenders: open, selective, and negotiated • Comparative bid analysis: preparing a tender comparison statement • Arithmetic check, bid adjudication, and recommendation report • Interim payment certificates (IPC): valuation of work done on site Retention, advance payment, and milestone payment schedules **15. Contract Administration, Variations & Final Account** • Types of contracts: lump sum, remeasurement, cost-plus, design-build • Variation orders (VO): identification, valuation, and approval process • Claims: extension of time (EOT), loss and expense, delay analysis • Daywork sheets and provisional quantities reconciliation • Final account preparation: agreed final sum and settlement statement • Value engineering (VE): cost reduction without scope compromise **16. Capstone Projects & Course Review** • Capstone A: Complete BoQ for a 2-storey residential villa (substructure to finishes) • Capstone B: Cost estimate and tender evaluation for a commercial fit-out project • Capstone C: Digital take-off and automated BoQ report using CostX/Excel • Capstone D: Final account and variation log for a sample construction contract • Course review: common take-off errors and best QS practices Pathways: RICS APC, Primavera cost control, BIM 5D, PQS certification					