GOVERNMENT OF THE PUNJAB

TECHNICAL EDUCATION & VOCATIONAL TRAINING AUTHORITY

CURRICULUM FOR

QUANTITY SURVEYOR

(6 – Month Course)

CURRICULUM SECTION

ACADEMICS DEPARTMENT

96-H, GULBERG-II, LAHORE

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TRAINING OBJECTIVES:

Rapid development in construction industries has been experienced in recent years due to enhanced activities of industrial, commercial and estates enterprises. Use of advanced construction techniques, materials and equipment along with conventional means demanding changes as per present needs, this curriculum of quantity surveyor trade has been developed to fulfill employment requirement of constructing / consulting industries. The application of relevant software's has also been introduced so that the pass out of this course will have command on the latest application tools. The curriculum is divided into two parts institutional training (24 weeks) and internship (4 weeks). It is intermediate level course. Upon completion of six months quantity surveyor course, the pass outs will be able to perform duties as assistant of quantity surveyor. For becoming a full quantity surveyor they have to go through an advance level course of studies.

CURRICULUM SALIENT:

Entry level	:	Matric with certificate in Draftsman civil or Matric with two years experience in relevant field or DAE (Civil)
Duration	:	6 - Months
Total contact hrs	:	600 Hours
	:	24 ½ Hours per week
	:	6 days per week
Training Strategy	:	Practical 80%
	:	Theory 20%
Medium of Instruction	:	Urdu / English

- ½ hour per week for Work Ethics

KNOWLEDGE PROFICIENCY DETAILS:

On successful completion of this course, the trainee should be able to: -

1. Describe the general principles of estimating quantities and cost of civil works.
2. State the units of measurement for different items of work in buildings and civil works.
3. Describe the building components and sequence of their construction.
4. Express the labour efficiency, labour rates and wages etc.
5. Prepare material statement and analysis of rates for major item of work.
6. Explain the method of taking off quantities of item of works and materials from given drawings.
7. Describe the standard specifications of each item of works.
8. State the use & efficiency of construction machinery.
9. Describe the methods of execution of works.
10. Explain the method of works record & payment procedure.
11. Describe the method of property evaluation and rent calculation.
12. Explain the method to determine quality of earthwork for road construction.

SKILL PROFICIENCY DETAILS:

On successful completion of this course, the trainee should be able to: -

1. Work out qualities of various items of works from working drawings.
2. Prepare material statement and analysis of rates for different item of works.
3. Prepare detailed estimates for residential, commercial and industrial buildings.
4. Prepare detailed estimates of a water supply and sewerage works.
5. Prepare detailed estimates for roads.
6. Prepare detailed estimates of R.C.C Bridge & culverts.
7. Prepare bill of quantities for buildings / civil works
8. Prepare contract documents.
9. Access and recommend payment to contractor during construction.
10. Use computer software in estimating quantities, cost and planning of project.
11. Perform property valuation & rent calculation.

SCHEME OF STUDIES

Quantity Surveyor

(6- Month Course)

Sr. No.	Main Topics	Theory Hrs.	Practical Hrs.	Total Hrs.
1.	Fundamentals of Civil Technology	37	20	57
2.	Estimation	66	349	415
3.	Computer Applications	17	99	116
4.	Work Ethics	-	12	12
Total		**120**	**480**	**600**

DETAIL OF COURSE CONTENTS

Quantity Surveyor

(6 – Month Course)

Sr. No.	Detail of Topics	Theory Hrs.	Practical Hrs.
1.	**Fundamental of Civil Technology**		
	1.1. Building Materials (Types & Properties)	6	-
	1.1.1. Bricks & Tiles		
	1.1.2. Concrete blocks		
	1.1.3. Course and Fine Aggregates		
	1.1.4. Structure stone { lime stone, sand stone, granite, marble }		
	1.1.5. Finishing Materials (Paints, Distemper, and Polish etc.)		
	1.1.6. Glass & Plastic, fiber glass		
	1.1.7. Timber		
	1.1.8. Metals: steel bars, joint, sheets		
	1.1.9. Water proofing materials		
	1.2. Concrete	2	
	1.2.1. Cement, types & properties		
	1.2.2. Types of Concrete		
	1.2.3. Water cement ratio		
	1.3. Building Components (types & functions)	4	
	1.3.1. Foundation, Shallow & Deep.		
	1.3.2. Damp Proof Course		
	1.3.3. Masonry work & Mortars		
	1.3.4. Walls (Load bearing / Partition)		
	1.3.5. Arches & Lintals		
	1.3.6. Floors		
	1.3.7. Roofs		

	1.3.8. Interior, exterior & Finishing 1.3.9. Stair & Stair case 1.3.10. Door & Windows 1.3.11. Fire protection		
	1.4. Form work 1.4.1. Types of form work 1.4.2. Form work for structural members 1.4.3. Scaffolding	1	
	1.5. Water supply & Drainage 1.5.1. Basic requirement for residential buildings 1.5.2. Types of water supply pipes, fittings, valves 1.5.3. Sanitary Fitting & Fixtures 1.5.4. Septic tank, open drain, sewer and manhole 1.5.5. Reading & interpret water supply & drainage layout plan for a residential building.	2	
	1.6. Electric Installation 1.6.1. Domestic electrification, cables types, fitting and accessories. 1.6.2. Wiring types, components of electric wiring 1.6.3. Reading & interpret electrification layout plan for residential building 1.6.4. Earthing details	1	
	1.7. Frame Structure 1.7.1. Types & components of R.C.C structures 1.7.2. Steel reinforcement	2	

	1.7.3. Role of steel in concrete structure 1.7.4. Steel Structure, Types & components.		
	1.8. Roads & Road Structures 1.8.1. History & classification of roads. 1.8.2. Road components & road geometry 1.8.3. Construction steps 1.8.4. Drainage of roads (culvert & bridge) 1.8.5. Fly over, intersection	2	
	1.9. Sewerage System 1.9.1. Types & components of sewerage system. 1.9.2. Sewer & sewer appurtenance. 1.9.3. Composition of sewage 1.9.4. Introduction to sewage treatment and disposal.	2	
	1.10. Irrigation & works 1.10.1. Irrigation system in Pakistan. 1.10.2. Related terminology 1.10.3. Introduction to dams, barrages, and river training works 1.10.4. Cross drainage works 1.10.5. Distributions works 1.10.6. Tube wells (Components & construction)	2	
	1.11. Survey 1.11.1. Methods of surveying 1.11.2. Survey symbols 1.11.3. Surveying instruments 1.11.4. Terms used in leveling 1.11.5. Leveling book & entries	4	

	1.11.6. Contouring related terms 1.11.7. Practice to use level, taking readings and recording on level book. **1.12. Railway** 1.12.1. Railway track & its components. 1.12.2. Points, crossing & signals 1.12.3. Maintenance of permanent way. **1.13. Technical Specifications** 1.13.1. Relationship of specification and drawings. 1.13.2. General Specification 1.13.3. Detailed specification of important item of works **1.14. Building Standards** 1.14.1. General requirement of different types of buildings 1.14.2. Standards for bath, Kitchen & Bed rooms etc. **1.15. Construction Plants & Equipment** 1.15.1. Types of construction plants; mixers, batching plants, lift, vibrators etc, their use and outputs. 1.15.2. Excavation, road making and others machinery; their uses and outputs.	1 4 2 2	20

2.	**Estimation**		
	2.1. Measurement System	1	
	2.1.1. Foot-Ib System & Metric System		
	2.1.2. Conversions of Foot Ib System to Metric System and vice versa		
	2.1.3. Multiples and parts of units.		
	2.1.4. Exercise to solve problems regarding conversion, additions, multiplication and division of measurements		3
	2.2. Areas	2	
	2.2.1. Area of rectilinear plane figures (Square, rectangle, triangle and Rhombus etc.) and circle, segment, sector etc.		
	2.2.2. Areas of irregular figures		
	2.2.3. Practice in calculating areas of plane geometrical figures		2
	2.2.4. Practice in calculating areas of composed plane figures		2
	2.2.5. Practice to calculate areas of irregular figure		3
	2.2.6. Practice in calculating covered area of building from working drawings.		6
	2.3. Volume	2	
	2.3.1. Volume of solid figures.		
	2.3.2. Surface area of solid geometrical figures.		
	2.3.3. Quantity of liquid in container.		
	2.3.4. Practice in calculating volume and surface area of solid geometrical &		6

	composed figures.		
	2.4. Trigonometry	3	
	2.4.1. Pythagorean Theorem		
	2.4.2. Trigonometric ratios		
	2.4.3. Solutions of triangle		
	2.4.4. Sine Law		
	2.4.5. Practice in solving problem regarding trigonometric ratio, Pythagorean theorem etc.		12
	2.5. Weight	1	
	2.5.1. Weight and its units		
	2.5.2. Specific gravity.		
	2.5.3. Weight of different materials		
	2.5.4. Percentage		
	2.5.5. Exercise to solve problem		2
	2.6. Introduction to estimation	1	
	2.6.1. Types of Estimates.		
	2.6.2. Necessity of estimate		
	2.6.3. Terms used in Estimation		
	2.7. Rough Cost Estimates		
	2.7.1. Methods of rough cost estimation	1	
	2.7.2. Instructions for preparing rough cost estimate of residential building, public building, commercial & industrial building & water supply and sewerage scheme	2	
	2.7.3. Practice in preparing rough cost estimate of various types of residential and public building with the help of given drawing and rates.		12
	2.7.4. Practice in preparing rough cost		9

			estimate of commercial building and industrial buildings with help of given drawing & data.	
		2.7.5.	Practice in preparing rough cost estimate of water supply and sewerage scheme for a small colony.	4
	2.8.	**Detailed Estimate (Building)**		
		2.8.1.	Prerequisites; detailed drawings, specification, schedule of rates (market rates, labour rates) and overhead charges.	1
		2.8.2.	Important item of works in building along with brief specification, unit of measurements and rules for taking / measuring quantities	2
		2.8.3.	Methods of taking out quantities; Long & short wall method, and Centerline method.	2
		2.8.4.	Instructions for taking out quantities of various types of walls	1
		2.8.5.	Practice in taking out quantities of works (Excavation, lean concrete, brick work in foundation, D.P.C, brick work in supper structure) for straight T, L, H, F, and U shaped and circular walls.	12
		2.8.6.	Instruction for working out quantities of all item of works (Building portion) of a residential building	1

	2.8.7. Practice in taking out quantities of all items of work (building portion only) of a single room quarter.		6
	2.8.8. Preparation of abstract of quantities for two rooms' quarter.		12
	2.8.9. Consulting schedule of rates & preparing of abstract of cost.	2	
	2.8.10. Practice in consulting schedule of rates and working out cost for above two room quarter.		4
	2.9. Material Statement		
	2.9.1. Time saving practices	1	
	2.9.2. Taking – off materials for different items of building works	1	
	2.9.3. Practice in taking-out materials for following item of works with various ratios & quantities, brick work, cement plaster, R.C.C, Cement pointing & D.P.C. etc.		12
	2.10. Detailed estimate of water supply and sanitary installation in a residential building		
	2.10.1. Water supply fittings & pipes	½	
	2.10.2. Instruction for taking out quantities of water supply fittings, fixtures and length of supply line	1	
	2.10.3. Sanitary fixtures and fitting	½	
	2.10.4. Instructions for taking out quantities of excavation work, lengths of sewer line with help of sanitary layout plan	1	

	2.10.5. Practice in taking out quantities for small domestic manhole (rectangular & circular).		3
	2.10.6. Practice to calculate w/s and sanitary, fixtures, fitting and length of piping for different patterns of baths and kitchens		4
	2.10.7. Preparation of detailed estimate of w/s & sanitary installation & fittings for residential buildings (two rooms quarter and 10 Marla residence) with the help of w/s & sanitary plan		8
	2.11. Detailed estimate of Electrical Installation in a residential building		
	2.11.1. Electrical fitting & fixture.	½	
	2.11.2. Points & length of cable	½	
	2.11.3. Instruction for taking out details of Electrical fitting & fixture and length of cable for a residential building.	1	
	2.11.4. Preparation of detailed estimate for electrification of residential buildings (two rooms quarter and 10 Marla residence) with the help of electrical layout plan)		10
	2.12. Frame Structures (Concrete)		
	2.12.1. Steel reinforcement; types, sizes and unit weights.	½	
	2.12.2. Concrete covers; slab, beam, column and retaining wall etc.	1	
	2.12.3. Cut length of straight bars & bend up bars, standard hooks and bends	1	

	2.12.4. Proforma for bar bending schedule	½	
	2.12.5. Practice in calculating cut lengths of straight bars and bend up with hooks or bend having various diameters.		4
	2.12.6. Practice in preparation of bar bending schedule for small isolated roof slabs.		3
	2.12.7. Types of stirrups & rings.	½	
	2.12.8. Cut length for different types of stirrups.	½	
	2.12.9. Dowel bars Overlaps, compression steel & tensile steel.	1	
	2.12.10. Practice in preparation of bar bending schedule for an isolated beams		5
	2.12.11. Practice in preparation of bar bending schedule for an isolated column footing & column		4
	2.12.12. Preparation of detailed estimate of a frame structure building (double storey) i/c bar bending schedule but excluding water supply & sanitary portions.		24
	2.13. Sewer line & Drains		
	2.13.1. Components of sewer line & Sewer sections	1	
	2.13.2. Preparation of estimate for moderate length of sewerage line with manholes.		8
	2.13.3. Preparation of detail estimate of		8

	open drains and collection chamber.		
	2.14. Septic Tank		
	2.14.1. Components & purposes	½	
	2.14.2. Preparation of estimate of a domestic septic tank with two chamber		6
	2.15. Earth work		
	2.15.1. Lead, lift, Borrow pit, N.S.L, F.L, Gradient and side slopes.	1	
	2.15.2. Methods of calculating earthwork, average depth method, average X-sectional area method, graphical method and coordinate method.	2	
	2.15.3. Practice in calculating quantity of earthwork by various methods for a small length of embankment.		6
	2.15.4. X-Section & L-Section marking of gradient & side slope.	1	
	2.15.5. Sketching X-sections and L-Section of proposed road embankment with the help of level book and design data.		6
	2.15.6. Computation of earthwork from above x-sections & L-section of road embankment (coordinate method & mean area method.		12
	2.15.7. Hill roads, method of computing earthwork for section partly in filling and partly in cutting.	2	
	2.15.8. Practice in computations of		20

	earthwork for hill roads.		
	2.16. Roads		
	2.16.1. Types of Roads and Road structure (sub grade, subs base, base & wearing coat).	1	
	2.16.2. Item of works, land acquisition,	½	
	2.16.3. Instruction for taking out quantities of different item of works such as road metal, carriage of road metal.	1	
	2.16.4. Preparation of detailed estimate for a bitumen road. (1 km length)		6
	2.16.5. Preparation of detailed estimate for concrete road. (1 km length)		6
	2.17. Culvert & Bridges		
	2.17.1. Parts of culvert	1	
	2.17.2. Instructions for taking out quantities for small slab culvert, pipe culvert, arch culvert	1	
	2.17.3. Preparation of detailed estimate of slab culvert (10ft span)		12
	2.17.4. Types & components of bridge	1	
	2.17.5. Components of foundation (well foundation, piles foundation)	1	
	2.17.6. Instructions for taking out quantities for well foundation	1	
	2.17.7. Practice in calculating qualities for well foundations & different types of solid piers		8
	2.17.8. Preparation of complete estimate of two span bridge (20 ft span)		16
	2.18. Analysis of Rates		

	2.18.1. Components for rate analysis; Material rates, carriage, Labour rates, Labour efficiency, Tools & Plants, contractor profit.	1	
	2.18.2. Requirement and efficiency of Labour team for different works.	½	
	2.18.3. Requirement of material for different item of works	½	
	2.18.4. Prepare analysis of rates for the following items		16
	2.18.4.1. Brick Work		
	2.18.4.2. R.C.C. (1:2:4), (1,1½,3), (1,3,6)		
	2.18.4.3. Cement Plaster (1:3) (1:5)		
	2.18.4.4. Cement pointing (1:1),(1:2)		
	2.18.4.5. Concrete floor		
	2.18.4.6. Dry brick paving.		
	2.18.4.7. Distempering & white washing		
	2.19. Annual & Special Repair Estimates		
	2.19.1. Types of Repair works, yard stick for annual repair	1	
	2.19.2. Preparing annual repair and special repair estimate for a college building		6
	2.19.3. Preparing of special repair estimates for road & road structure.		4
	2.20. Works Record & Payments		
	2.20.1. Measurement book & standard measurement book.	½	
	2.20.2. Rules / instructions to be followed	1	

	for measurements of materials and all items of works for building and road structures		
	2.20.3. Instructions for recording measurements in Measurement book (MB).	½	
	2.20.4. Prepare first running bill for a residential building (using estimate prepared for 10 marla house)		4
	2.20.5. Prepare 2nd running bill for the same		4
	2.20.6. Prepare final bill for the same		4
	2.21. Property Evaluation		
	2.21.1. Purposes of valuation Market value, book value, scrap value, Salvage value, years purchase	1	
	2.21.2. Methods of calculating depreciations.	2	
	2.21.3. Method of valuation; Depreciation method, standard rent method etc.	2	
	2.21.4. Practice in calculating value of properties by different methods		8
	2.21.5. Fixation of rent; Methods	1	
	2.21.6. Practice in calculating rent of different buildings.		4
	2.22. Methods of Execution of works	2	
	2.22.1. Piece work contract		
	2.22.2. Labour contract		
	2.22.3. Item rate contract		
	2.22.4. Other types of contracts etc.		
	2.23. Tender Notice & Tender Documents	4	

	2.23.1. Components of tender document 2.23.2. Term & conditions of tender 2.23.3. Bill of quantities 2.23.4. Tender Notice. 2.23.5. Comparative statement 2.23.6. Work order 2.23.7. Preparation of tender document for the construction of a residential building.		12
3.	**Computer Applications**		
	3.1. Introduction to computer	1	
	3.1.1. Brief history of computer		
	3.1.2. Input output devices		
	3.1.3. Hardwares, softwares		
	3.1.4. Programmes		
	3.2. Operating System (Window)	2	
	3.2.1. File System		
	3.2.2. Window interface		
	3.2.3. Window help		
	3.2.4. Practice in opening & closing window		1
	3.2.5. Practice in Opening, Saving & closing files		1
	3.2.6. Practice in interface		2
	3.2.7. Practice in using help		4
	3.3. Word Processing	2	
	3.3.1. Introduction to MS word		
	3.3.2. Opening, closing word processor program		
	3.3.3. Opening, closing & saving documents		

	3.3.4.	Editing, Navigating, Viewing and printing documents		
	3.3.5.	Formatting documents and inserting objects		
	3.3.6.	Enhancement, tools & tables		
	3.3.7.	Practice in opening, saving & closing documents.		1
	3.3.8.	Practice in editing and navigating documents		2
	3.3.9.	Practice in formatting documents and inserting object.		2
	3.3.10.	Practice in enhancement, tools and tables.		4
	3.3.11.	Practice to type and formatting reports / letters and email merge.		10
	3.4.	**Spread Sheet (Excel)**	6	
	3.4.1.	Introduction to MS Excel		
	3.4.2.	Opening & closing spread sheet		
	3.4.3.	Data types, worksheet and workbook		
	3.4.4.	Data manipulation		
	3.4.5.	Printing work sheet		
	3.4.6.	Formatting cells		
	3.4.7.	Function and function wizard		
	3.4.8.	Practice in opening & closing spread sheet		1
	3.4.9.	Practice in data manipulation.		4
	3.4.10.	Practice in printing work sheet		1
	3.4.11.	Practice in formatting cells		4
	3.4.12.	Using formula regarding quantity surveying		4

	3.4.13. Practice in function and function wizard.		4
	3.4.14. Practice to feed data in spread sheets for preparing different types of estimates		24
	3.5. Auto CAD (2D)	6	
	3.5.1. Introduction to Auto CAD		
	3.5.2. Auto CAD Menus		
	3.5.3. Auto CAD graphic window		
	3.5.4. Coordinate system		
	3.5.5. Draw commands		
	3.5.6. File Commands		
	3.5.7. Edit commands		
	3.5.8. Settings		
	3.5.9. Dimensioning		
	3.5.10. Display commands		
	3.5.11. Modified commands		
	3.5.12. Plotting, how to plot different object of two-room house in CAD		
	3.5.13. Practice of Auto CAD Menu, Draw Commands, Coordinate systems, File commands, Edit commands, Setting, Dimensioning, Display command, modified commands etc.		18
	3.5.14. Practice to draw plan of two room house.		6
	3.5.15. Practice of calculating area, parameter of different objects, drawings,		6
4.	**Work Ethics**	-	12
TOTAL		**120**	**480**

FURNITURE

Sr. No.	Name of Article	Quantity
1.	Working bench	10
2.	Wooden stool (for students)	20
3.	Chair for teacher	02
4.	White board (3 ½ x 5ft) with stand	01
5.	Steel Almirah (4 x 7 ft)	04
6.	Instructor table with 3 drawers	01

LIST OF MACHINERY / EQUIPMENT / TOOLS ETC.

(For a Class of 20 Students)

Name of Trade	**Quantity Surveyor**
Duration of Course	**6 – Months**

Sr. No	Nomenclature of Equipment / Tool	Quantity
1.	Auto set level with stand	12 Nos.
2.	Leveling staff	12 Nos.
3.	Computer P-IV complete set	26 Nos.
4.	Server along with networking	01 Set
5.	Computer table	26 Nos.
6.	Computer Chair	26 Nos.
7.	Software auto CAD, MS Office and MS Excel	25 Sets.

QUALIFICATION OF TEACHER

1. B.Sc. Engg. / B. Tech (Hons) with minimum 2 – years experience in the field of Quantity Surveying.

OR

2. DAE (Civil) with 4 – years experience in the field of Quantity Surveying.

OR

3. Civil Draftsman certificate (2–years) with 6-years experience as Quantity Surveying

EMPLOYABILITY OF PASS-OUTS

The pass outs of this course may find job / employment opportunities in the following areas / sectors: -

1. Railway
2. Highway
3. Air Ports
4. Building Department
5. Military Engineering Services.
6. Contractors
7. Consultants
8. Education Department
9. Irrigation
10. Banks Sector for Evaluator

REFERENCE BOOKS

1. Quantity Surveying
   By Dittu
2. Quantity Surveying
   By Allah Bukhash Malik