



CIQS Syllabus	Original:	May 28, 1993
Course No: A306	Rev. No:	7
Course Title: Measurement and Pricing of Civil Works	Rev. Date:	October 6, 2019

Course Description:

The aim of the subject is to develop estimating knowledge of heavy/civil construction projects such as earth moving, roadwork and utilities etc. The candidate will define the scope using the appropriate work breakdown structure, plan for resources (labor, equipment, material, and subcontract), calculate quantities, price work items, figure indirect costs, set up the bid estimate and complete tender form including unit prices.

Suggested Prerequisites:

The subject builds on the following prerequisites and hence knowledge of these previous subjects are required:

Course No:

- A102 – Construction Technology I
- A103 – Measurement of Construction Work I
- A104 – Surveying Principles and Applications
- A201 – Construction Technology II
- A202 – Measurement of Construction Work II
- A207 – Construction Technology III
- A301 – Measurement of Construction Work III

Learning Outcomes:

Upon successful completion, the candidate will be able to:

Describe the construction means and methods to carry out the heavy/civil work
Describe the types and functions of construction equipment used for heavy/civil work
Explain the difference of heavy construction estimating vs. building construction estimating
Measure and price earthmoving operation including interpreting mass diagrams for work planning
Measure and price the components of road construction including production rate based estimating
Measure and price underground utility work including water supply and sanitary/storm sewer systems
Measure and price deep foundation systems and associated reinforced concrete structural elements
Calculate the detailed equipment, labour, material and subcontractor costs required for each work item
Calculate the indirect costs required including jobsite overhead, office overhead, contingency etc
Complete the horizontal and vertical pricing processes to reach the final tender amount
Develop unit rates for each bid item including prorated “add-ons”
Explain the difference of balanced bid vs. unbalanced bid and associated impacts

Learning Resources

Required Textbooks and Materials:

Estimating Construction Costs, 6th Edition, by Robert L. Peurifoy & Garold D. Oberlander

Construction Planning, Equipment, and Methods, 9th Edition, by Robert L. Peurifoy, Clifford J. Schexnayder, Robert Schmitt & Aviad Shapira



Additional Reference Materials:

Estimating and Bidding for Heavy Construction, 1st Edition, by Stuart H. Bartholomew

Surveying with Construction Applications, 8th Edition, by Barry F. Kavanagh

CCDC 4 Unit Price Contract

CCDC 18 - 2001 Civil Works Contract

CCDC 48 - 2002 A Guide to the Use of CCDC 18-2001

Guided Course Learning

In the course of studies from the required texts, the candidate will cover:

Chapters 5 to 10 and 19 to 21, inclusive, of **Estimating Construction Costs** by Robert L. Peurifoy & Garold D. Oberlander, dealing with: Cost of Construction Labour and Equipment; Hauling and Transporting Material; Earthwork and Excavation; Highways and Pavements; Foundations; Concrete Structures; Sewerage Systems; Water Distribution Systems; and Total Cost of Engineering Projects.

Chapters 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17 of **Construction Planning, Equipment, and Methods** by Robert L. Peurifoy Clifford J. Schexnayder, Robert Schmitt & Aviad Shapira, dealing with: Planning for Earthwork Construction; Compaction and Stabilization Equipment; Mobile Equipment Power Requirements; Dozers and Graders; Scrapers; Excavators; Trucks and Hauling Equipment; Drilling Rock and Earth; Blasting Rock; Aggregate Production; Asphalt Mix Production and Placement; Piles and Pile-Driving Equipment

Evaluation:

The exam will be a 3-hour closed book written examination comprising both calculations and short/long discussion questions.

It is required that the student bring a non-programmable calculator to the exam. No cell phones or lap tops will be allowed.