

CE 49A COST ENGINEERING AND CONTROLLING

Elective Course

Spring 2009

Instructor(s): Name: Mehmet Sait Culfik

Course Data: Hours: StStSt678

Room: M 3120

Course Description (Catalog): (Proposed)

CE49A.01 Cost Engineering and Controlling

Application of cost engineering for construction projects, Bidding procedures, Construction Cost Estimating, Conceptual and preliminary estimates, detailed cost estimate, Project Monitoring and Cost Controlling, Construction Accounting Systems, Earned Value, Performance Indices, Cash Flow Management.

Prerequisite: NA

Course Objectives (Learning Outcomes):

To build the necessary theoretical background for cost engineering.

To establish an understanding of the fundamental concepts of construction project cost estimation.

To establish an understanding of the fundamental concepts of construction bid preparation.

To provide students with principles of construction accounting systems.

To provide students with principles of project monitoring and cost controlling.

To provide students with principles of cash flow analysis of construction projects.

Textbook:

Construction Project Management by Richard H. Clough, Glenn A. Sears, S. Keoki Sears

Construction Accounting and Financial Management, Steven J. Peterson

Reference Books:

Professional Construction Management, Barrie, D.S. and Paulson, B.C.

Curricular Context

This course emphasizes the application of cost engineering for construction projects. The students are acquainted with the principles and practices of Construction Cost Estimating, Construction Project Cost Controlling and Cash Flow Management. A comprehensive term project about cost estimation and bid preparation of a construction project is assigned to develop the Students' ability of cost estimation and bid preparation in practice.

Laboratory and Computer Usage:

N/A

Class Policies:

Midterm exams: One midterm exam, 30% of the course grade.

Term project: 20% of the course grade.

Attendance 10 %

Final exam: Comprehensive exam at the end of the semester, 40% of the course grade.

Contribution of the Course to Program Outcomes:

(a) An ability to apply knowledge of mathematics, science and engineering

(c) An ability to design a system, component, or process to meet desired needs such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) An ability to function on multi-disciplinary teams

(e) An ability to identify, formulate and solve engineering problems

(i) A recognition of the need for, and ability to engage in life-long learning

(k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Course Assessment:

Course will be assessed on the basis of the accomplishments regarding the course objectives and the contributions to the program outcomes. The evaluation will consist mainly of the responses from the students, who will provide their comments to various course related questions in the final week of the semester.

WEEK	SUBJECT	CONTENT
1	Overview of Construction Industry; Introduction to Cost Engineering	Types of Construction Projects, Development of Construction Projects, Costs Associated with Constructed Facilities, ,Level of Influence of The Life Cycle of Construction Projects on Project Costs, Approaches to Cost Estimation, Project Cost Management,
2	Conceptual and Detailed Estimates	Types of Cost Estimates, Conceptual and Preliminary Estimates, Types of Conceptual Estimates, Index Number Estimates, Cost Capacity Factors, Component Ratios, Unit Area and Unit Volume Estimates.
3	Detailed Estimates	Construction Bidding Documents, Unit Cost Formula, Components of Total Estimated Project Cost, Engineer's Estimate, Contractor's Bid Estimate, Control Estimate, Detailed Direct Cost Estimate, Quantity Take off, Unit Price Analysis
4	Estimating Process and Bid Preparation; Introducing Example Project ,Project Cost Estimating Part 1	Introducing Example Project for Cost Estimation and Bidding, Quantity Surveying, Management Inputs in Cost Estimation (Field Supervision, Construction Methods, General Time Schedule, Construction Equipments, Summary Sheets).
5	Esimating the Labor Costs, Project Cost Estimating Part 2	Characteristics of Material, Labor and Equipment Costs. Direct and Indirect Labor Costs. Estimating and Controlling Labor productivity, Learning Curve, Equipment production and cost rates.
6	Finalizing Bid Preperation, Project Cost Estimating Part 3	Principles of Subcontracting, Project Overheads, Home Office Overheads, Markup, Contract Bonds, Recap Sheet and Completed Bid Form, The Project Budget, Project Planning with Bar Charts.
7	Project Monitoring and Cost Controlling	Control Budgets, Cost Codes, Project Monitoring and Collecting Data, Labor and Equipment Time Sheets, Measuring and Reporting Work Quantities, Content of Cost Control Reports.
8	Construction Accounting Systems	Construction Accounting Systems, General Ledger, Job Cost Ledger, Equipment Ledger, Balance Sheet, Income Statement, Methods of Accounting, Depreciation, Financial Analysis and Ratios.
9	Managing Costs, Earned Value, Cost and Schedule Performance Index	Cost Loaded Schedule, Monitoring Job Performance and Profitability, Earned Value Analysis, Schedule Performance Index, Cost Performance Index.
10	Contractual Facts in Cash Flow Analysis	Fundamentals of Contract Management and Relations with Cost Management, An overview of Contract Management, Main Contract Terms to Know, Proeject Delivery Systems, Major Contract Types, Contract Provisions that Effect the Cost Management (adevanced payment, terms of payment, retention, final acceptance, etc), Case Study.
11	Managing Cash Flows	Financial Threats for Construction Companies, Critical Issues that Effect the Cash Flow of Construction Projects, (Time Schedule, Contractor Cash Disbursements, Contract Provisions, Owner Policies, Time Value of Money), Developing a Cash Flow for a Construction Project, Peak Cash Flow Concept.