Certified Estimating Professional (CEP)
Certification Review Course

Presented By:

[Section Name]

[Instructor Name, CCP]

[Event Dates]

A Product of the Education Board

Submit questions, comments or updates to
Manager, Education: education@aacei.org

web.aacei.org

AACE INTERNATIONAL

Section Index

CEP Certification Review

Why We Are Here

- **Benefits of Certification**
  - An investment in your career
  - Officially and publicly recognizes professional capability
  - Demonstrates a high level of competence & ethical practice
  - Identifies to employers and clients your capabilities
  - Recertification ensures that you continue to develop
  - Shows that you are deemed qualified and capable of professionally applying the principles of cost engineering
- **AACE Certification**
  - CST Certified Scheduling Technician
  - CCT Certified Cost Technician
  - CCP Certified Cost Professional (Technical Paper required)
  - CEP Certified Estimating Professional
  - CFCC Certified Forensic Claims Consultant (Written report or paper required)
  - DRMP Decision & Risk Management Professional

Why We Are Here – CEP Eligibility

- 8 years validated industry related experience

OR

- 4 years validated industry related experience plus 4-year industry related college degree
  - There is no technical paper requirement
  - All exam candidates must accept AACE's Canon of Ethics
  - Fees are payable upon registration
  - There will be an eligibility documentation review
  - Fee payable in US$ is $500 for Members and $625 for Non-Members
  - Recertification is required every 3 years by earned credits or exam

  - EVP Earned Value Professional
  - PSP Planning & Scheduling Professional

Why We Are Here – Workshop Objectives

- Identify certification eligibility requirements
- To prepare eligible candidates for the CEP exam by reviewing the AACE recommended study materials
- Present overviews of subject matter that MAY be included in the exam
- Work through various samples of the different types of questions for each subject
- Present a guide to writing the Memo portion of the exam

Why We Are Here – CEP Exam Structure

- Basis of Content: AACE definitions, CEP Certification Study Guide, S&k6, TCM and RP References
- CEP Exam is conducted through Kryterion computer based testing centers
- 5 hours maximum allowed
- 120 randomized questions comprising:-
  - Continuous multiple choice questions
  - Compound questions and complex estimating calculations which test the candidate's Cost Estimating knowledge, principles and practices
- Memo writing assignment chosen from onscreen list
- No break once the session is launched
- Closed book environment

Primary Reference Materials

- Certified Estimating Professional Study Guide, 2nd Edition
- Skills & Knowledge of Cost Engineering, 6th Edition
- AACE International Total Cost Management Framework
- AACE International Recommended Practice 46R-11 (Skills & Knowledge for Estimating)
- CEP Examinee Format of Definitions (RP 10S-90)

Each content section addressed in the CEP Certification Study Guide is organized as follows:

- Introduction
- Learning Objectives
- Reference/Study Material
- Terms to Know
- Key Points for Review
- Summary
- Sample Questions
- Sample Question & Answers

Recommended Practices (RP)

RP #	RP Title
10S-90	Cost Engineering Terminology
17R-97	Cost Estimate Classification System
18R-97	Cost Estimating Classification System – As Applied in EPC for the Process Industries
19R-97	Estimate Preparation Costs in the Process Industries
34R-05	Basis of Estimate
36R-08	Development of Cost Estimate Plans – As Applied in EPC for the Process Industries
46R-11	Required Skills and Knowledge of Project Cost Estimating
56R-08	Cost Estimate Classification System – As Applied for in the Building and General Construction Industries
58R-10	Escalation Estimating Principles and Methods Using Indices
59R-10	Development of Factored Cost Estimates – As Applied in EPC and Construction for the Process Industries

What You Will Need to Know

#	Question
1.	What is estimating?
2.	What is the role of the cost estimator?
3.	What is budgeting?
4.	What is quantification?
5.	What are the different classes of estimates?
6.	What is the difference between costing and pricing?
7.	What are the different types of parametric methodologies?
8.	What are codes of accounts and their use?
9.	What is Building Information Modeling (BIM)?
10.	What the fundamental considerations for internationalization?
11.	What is the difference between accuracy and contingency?
12.	What are cost estimating relationships (CERs)?
13.	What are locations factors?

What You Will Need to Know (cont.)

#	Question
14.	What are life cycle costs?
15.	What are the differences between direct and indirect costs?
16.	What is the difference between a Hand factor and a Lang factor?
17.	What is the difference between a work package and an assembly?
18.	What are the keys to cost and scheduling integration?
19.	What are some of the challenges for change order estimating?
20.	What is the difference between a composite and an average crew rate?
21.	What are the differences between bare rates and burdened rates?
22.	What is the difference between material unit price and material price?
23.	What is the difference between unbalancing and front-end loading?
24.	What are the different types of Work Breakdown Structures (WBS) and use?
25.	What is the difference between labor productivity and a labor productivity factor?
26.	How does change order estimating differ from project estimating?
27.	What is the importance of project cash flow?

Skills and Knowledge

- Skills and Knowledge of Cost Engineering
  - 1.0 Supporting Skills and Knowledge
  - 2.1 General Estimating Concepts
  - 2.2 Estimating Processes and Practices
  - 2.3 Other Estimating Issues
  - 3.0 Additional Studies

Introduction

AACE International defines ***Cost Engineering*** as:

"that area of engineering practice where engineering judgment and experience are utilized in the application of scientific principles and techniques to the problems of cost estimating, cost control, and profitability"

Introduction

- "Cost" Engineering can be divided into three components:
  - Cost Estimating
  - Cost Control
  - Cost Technology

Introduction

- "Cost" Engineering can be divided into three components:
  - **Cost Estimating**
    - Quantifying capital costs of investment alternatives
    - Costing design and execution alternatives for optimization
    - Providing estimates for funding decisions and cost control
  - Cost Control
  - Cost Technology

Introduction

- "Cost" Engineering can be divided into three components:
  - Cost Estimating
  - **Cost Control**
    - Implementing responsive cost feedback systems
    - Analysis of trends and the impact of management decisions
    - Developing and recommending corrective action(s)
  - Cost Technology

Introduction

- "Cost" Engineering can be divided into three components:
  - Cost Estimating
  - Cost Control
  - **Cost Technology**
    - Producing estimating methods and cost data
    - Development of cost control techniques/tools
    - Measurement of cost levels and trends

Introduction

Cost Engineering (including Estimating) is an *essential part of any project in any industry*.

Introduction

- Cost Engineering evolved out of the need for sound business decisions regarding projects.
- The basic reasons behind projects are primarily economic:
  - What is the maximum return that can be attained for the money invested by a company
  - What product - How Much - Where – When
  - Obtaining the answers to these questions requires economic studies which in turn require cost estimates

Introduction

- Purpose of an Estimate:
  - Establish Target Budget for a Project
  - Define the Scope of a Project
  - Assist in the Evaluation of Rate of Return on Investment
  - Assist in the Projection of Cash Flow
  - Establish Basis for Cost Control during Project Execution

Introduction

Definition of a Capital Project

"An endeavor with a specific objective to be met within the prescribed time and dollar limitations and which has been assigned for definition or execution."

(AACE 10S-90)

- Capital Project
  - Defined beginning and ending
  - Takes time and resources to accomplish
  - Unique undertaking
  - Even if technical scope is the same, differences in location or time can be important

Introduction

- Capital Project Estimate
  - **The challenge for the estimator is to evaluate the unique combination of required resources to provide a cost estimate for a project to be completed in the future**
- Capital Project Estimating
  - Record all sources of information, methods of calculation, pricing basis, and assumptions
  - Base estimate on as much fact as possible
  - Opinion, judgment, and assumptions are required because future events are being considered
  - Some level of error must be accepted
  - Basic estimating techniques are well established
  - This seminar is intended to summarize and review the estimating process and relevant estimating techniques

Definitions and Terminology

Definitions and Terminology

- What is a Cost Estimate ?
  - "An evaluation of all the costs of the elements of a project, or effort, as defined by an agreed-upon scope." (AACE 10S-90)
  - "To evaluate, and calculate, the approximate quantity, cost, or extent of a given item, or task. The product of a cost estimating procedure, which specifies the expected dollar cost required to perform a stipulated task, or to acquire a specific item. A cost estimate may constitute a single value or a range of values." (SCEA Glossary)

Project Cost Estimators

- Project cost estimators:
  - Predict the cost of a project for a defined scope, to be completed at a defined location and point of time in the future.
  - Assist in the economic evaluation of potential projects by supporting the development of project budgets, project resource requirements, and value engineering.
  - Support project control by providing input to the cost control baseline.
  - Collect and analyze data on all of the factors than can affect project costs, i.e., materials, equipment, labor, location, duration of the project, and other project requirements

Project Cost Estimators (cont.)

- According to AACE International Recommended Practice 10S-90, Cost Engineering Terminology, Cost Estimating is defined as:

"The predictive **process** used to **quantify, cost**, and **price** the **resources** required by the **scope** of an investment option, activity, or project. Cost estimating is a process used to **predict** uncertain future **costs**. In that regard, a goal of cost estimating is to minimize the **uncertainty** of the estimate given the level and quality of scope definition. The outcome of cost estimating ideally includes both an **expected cost** and a **probabilistic cost** distribution. As a predictive process, historical reference cost data (where applicable) improve the reliability of cost estimating. Cost estimating, by providing the **basis for budgets**, also shares a goal with cost control of **maximizing the probability of the actual cost outcome** being the same as predicted."

Definitions and Terminology

- Misconceptions about the definition of an estimate:
  - An estimate is the prediction of the actual costs of a project
    - No, the only thing we absolutely know about an estimate is that it is wrong
  - An estimate is the prediction of the "should costs" of a project
    - No, an estimate predicts what a project <u>will</u> cost, not what it should cost

Copyright 2020

Definitions and Terminology

- Cost Estimate:
  - A cost estimate is the prediction of the probable costs of a project, based on a given and documented scope, to be completed at a defined location and point of time in the future.
    - Involves assumptions and unknowns
    - Involves probabilities (and therefore ranges of costs)
    - Involves a given scope (contingency covers variability within the defined scope - not changes in scope)

Definitions and Terminology

- Accuracy
- Confidence Level
- Contingency

Definitions and Terminology

- Accuracy (Estimate):
  - The "closeness" to the actual costs (excluding scope changes, extraordinary developments, or disaster-like occurrences).
  - Often expressed as +X% and -Y%, meaning the actual costs will probably lie between:

Estimated Costs + X%, and

Estimated Costs - Y%,

where "Estimated Costs" are expressed without contingency.

Definitions and Terminology

- Confidence Level:
  - The probability that the final **actual cost** of a project will be **within the stated range** of the estimate.
  - The probability that the final actual cost of a project will be less than or equal to the estimated cost plus contingency.

Definitions and Terminology

- Contingency:
  - A special monetary provision in the budget of a project to cover the uncertainties, and unforeseeable elements of time/cost, within the scope of a project to achieve a specific confidence level.
  - Contingency excludes:
    - Changes in scope, and
    - Unforeseen major events such as:
      - earthquakes, hurricanes,
      - prolonged labor strikes, etc.

Definitions and Terminology

- Battery Limits
- Offsites Facilities

Definitions and Terminology

- Battery Limits:
  - Geographic boundaries, real or imaginary, enclosing a plant or (process) unit of a plant.
  - The term is generally used to describe a process-oriented unit of a plant, and excludes facilities such as utilities, storage, auxiliary facilities, office buildings, etc. (Onsites)
  - The term is sometimes used in reference to a single piece of equipment to refer to a small geographic area around the piece of equipment which includes an amount of piping, controls, foundation, etc. which are directly associated with the piece of equipment.

Definitions and Terminology

- Offsites Facilities:
  - Facilities located outside of the Battery Limits of a plant, which provide support for the process units.
  - These may include (but are not limited to):
    - utilities,
    - storage,
    - administrative facilities,
    - interconnecting pipeways,
    - etc.

Definitions and Terminology

- Capital Asset:
  - Assets of a permanent nature having continued value.
  - Must be depreciated over a pre-determined "lifetime".

Section 1.0
Supporting Skills and Knowledge