

International Cost Estimating and Analysis Association Testable Topics List



CCEA

Testable Topics List

The Testable Topics List

Cost Estimating Basics

COST ESTIMATING BASICS	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Applications of Cost Estimating	X				
<i>Budgeting, Investment, and Planning</i>	X				
<i>Analysis of Alternatives (AoA)</i>	X				
<i>Economic Analysis</i>	X				
<i>Cost Benefits Analysis</i>	X				
<i>Business Case Analysis</i>	X				
<i>Contracting and Project Management</i>	X				
<i>Design and Trade-Off Decisions</i>	X				
Requirements for Cost Estimating	X				
Limitations of Cost Estimating	X				
Types of Cost Estimates		X			
<i>Life Cycle Cost Estimate (LCCE)</i>		X			
<i>Independent Cost Estimate (ICE)</i>		X			
<i>Budget Estimate</i>		X			
<i>Proposal Estimate</i>		X			
<i>Rough Order of Magnitude (ROM)</i>		X			
<i>Economic Analysis (EA)</i>		X	X		
<i>Analysis of Alternatives (AoA)</i>		X	X		
<i>Activity-Based Costing (ABC)</i>		X	X		
<i>Price-Based Acquisition estimates</i>		X			
<i>SORAP (Source of Repair) Analyses</i>		X			
<i>Logistics Support Analysis (LSA)</i>		X			
<i>Performance-Based Logistics (PBL)</i>		X			
Cost Estimating Inputs and Products	X				
Requirements Documents	X				
<i>Capabilities Development Document (CDD)</i>	X				
Technical Baseline Description	X				
<i>Technical Baseline Description</i>	X				
<i>Proposals</i>	X				
<i>Request for Information (RFI)</i>	X				
<i>Estimate Documentation</i>	X				
Work Breakdown Structure (WBS) Development	X			X	
<i>WBS and Cost Element Structure (CES)</i>	X			X	
Program/System Baseline Definition	X			X	
Data Collection, Normalization, and Analysis	X				
Cost Element Methodology	X				
Estimate Development and Validation	X				
<i>Regression Analysis</i>	X				

COST ESTIMATING BASICS	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
<i>Risk Analysis</i>	X				
<i>Time Phasing</i>	X				
<i>Cross-Checks</i>	X				
Results and Report Generation	X				
<i>Estimate Reconciliation</i>	X				
<i>Informal Reviews</i>	X				
<i>Formal Reviews</i>	X				
Acquisition	X				
<i>Milestone decisions</i>	X				
<i>Contracting</i>	X				

Costing Techniques

COSTING TECHNIQUES	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Costing Techniques	X				
Analogy		X	X	X	
<i>Method</i>	X				
<i>Application</i>	X	X	X		
<i>Scaling/Adjustment</i>		X	X		
<i>Advantages and Disadvantages</i>	X				
<i>Quantification of Uncertainty</i>		X	X		
Parametric		X			
Build-Up		X			
Life Cycle Cost Elements	X				
<i>Adequacy of program definition</i>	X				
<i>Availability of data</i>				X	
Top-Down vs. Bottom-Up Approaches	X				
Cost Element Structure (CES)	X				
Calibration	X	X			
Comparison of Techniques				X	
Schedule Estimating and Time Phasing	X	X	X	X	
Adjusting Analogies	X	X	X		

Parametric Estimating

Parametric Estimating	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Parametric Estimating Concepts	X				
Slope	X	X	X		
Parametric Estimating Process	X				
Cost Driver Identification	X	X	X	X	
<i>Cost Drivers</i>	X			X	
<i>Proxy Variables</i>		X	X	X	
<i>Dummy Variables</i>	X	X	X	X	
Cost Estimating Relationship (CER) Development		X	X		
<i>Rates, Factors, and Ratios</i>		X	X		
<i>Regression</i>	X	X	X	X	
<i>Calibration</i>		X	X		
Parametric Model Development		X	X		
<i>Validation of Parametric Inputs</i>		X	X	X	
<i>Cost Response Curves (CRCs)</i>		X	X		

Data Collection and Normalization

Data Collection and Normalization	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Data Collection Process	X			X	
Data Collection Techniques	X			X	
Data Collection Issues	X			X	
Contextual Completeness		X	X		
Availability		X	X		
Accessibility		X	X		
Validity		X	X		
Timeliness		X	X		
Sampling / Measurement Error		X	X		
Data Normalization	X				
Cost Units		X	X		
<i>Inflation</i>		X	X		
<i>Overhead Changes</i>		X	X		
<i>Non-Recurring vs. Recurring Cost</i>		X	X		
<i>Direct vs. Indirect Cost</i>		X	X		
<i>Direct Labor</i>		X	X		
<i>Material Costs</i>		X	X		
<i>Overheads</i>		X	X		
Fringe		X	X		

Data Collection and Normalization	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
<i>General and Administrative (G&A)</i>		X	X		
<i>Profit/Fee</i>		X	X		
Cost Accounting Systems and Standards	X			X	

Index/Inflation

Index/Inflation	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Inflation and Cost Estimating				X	
Inflation Concepts and Definitions	X				
Inflation and Escalation	X	X	X		
Escalation vs. Discounting	X	X	X		
Index Numbers	X	X	X		
Current-Year dollars	X	X	X		
Constant-Year dollars	X	X	X		
Then-Year (budget-year) dollars	X	X	X		
Base-Year dollars	X	X	X		
Inflation Indices	X	X	X	X	
Raw indices		X	X		
Composite Indices		X	X		
<i>Weighted Average</i>		X	X		
Inflation Procedures	X	X	X	X	
Index Tables		X	X		
<i>Shifting Base Year of tables</i>		X	X		
Inflation Procedure Mnemonic		X	X		
CY\$ to CY\$		X	X		
CY\$ to TY\$		X	X		
TY\$ to CY\$		X	X		
TY\$ to TY\$		X	X		
Consumer Price Index (CPI) and Commercial Indices		X	X	X	
Time Phasing and Inflation		X	X	X	

Basic Data Analysis Principles

Basic Data Analysis Principles TOPIC	CCEA®			
	Part I or PCEA®		Part II	
	Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Types of data	X			X
Quantitative	X	X	X	
<i>Univariate</i>		X	X	
<i>Bivariate</i>		X	X	
<i>Multivariate</i>		X	X	
<i>Time Series</i>		X	X	
Qualitative	X			
Univariate Visual Display of Data	X			X
Histograms		X	X	
Box plots	X			
Stem-and-leaf plots	X			
Pie charts	X			
Univariate Descriptive Statistics		X	X	X
Measures of Central Tendency	X			X
<i>Mean</i>		X		X
<i>Median</i>		X		X
<i>Mode</i>		X		X
Measures of Dispersion	X			X
<i>Range</i>	X			
<i>Variance</i>				X
<i>Standard Deviation</i>				X
<i>Coefficient of Variation (CV)</i>				X
Univariate Inferential Statistics	X	X	X	X
t test for means			X	X
Chi-Square and K-S tests for distribution			X	X
Bivariate Visual Display of Data	X	X		
Scatter plots	X			
<i>Variables</i>				X
<i>Cost vs. time</i>				X
<i>Cost vs. parameter</i>				X
<i>Cost vs. cost</i>				X
<i>Function types</i>	X			X
Data Validation				X
Outliers		X	X	X
Other types of analysis	X			
Time series analysis		X		
Non-parametric analysis		X		
Systems of simultaneous equations		X	X	

Learning Curve

Learning Curve TOPIC	CCEA®			
	Part I or PCEA®		Part II	
	Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Learning Curve Theory	X			X
Learning Curve Concepts	X	X		
<i>Slope</i>		X	X	
<i>Theoretical First Unit (T1)</i>		X	X	
<i>100th Unit Cost ???</i>		X	X	
<i>Equation</i>		X	X	
Learning Curve Data	X	X	X	
<i>Unit Cost Data</i>		X	X	
<i>Cumulative Cost Data</i>		X	X	
<i>Cumulative Average Cost Data</i>		X	X	
<i>Unit with Rate</i>		X	X	
<i>Lot Data</i>		X	X	
Cumulative Average Learning Curve Theory (CUMAV)	X	X	X	
Unit Learning Curve Theory (ULC)	X	X	X	
Lot Data and Lot Midpoints (LMP)	X	X	X	
Learning Curve Application	X	X	X	X
Choosing a Learning Curve Theory		X		
Fitting a Learning Curve			X	
Learning Curves for New Programs			X	
<i>Learning Curves During the First Few Units</i>			X	
Factors Affecting Slope		X		
Advanced Topics				X
Production Rate Effects	X			
<i>Learn-rate curves</i>		X	X	
<i>Fixed cost curves</i>		X	X	
Production Break Effects	X	X	X	
<i>Break Point</i>		X	X	
<i>Andelohr</i>		X	X	
New Work Effects	X	X	X	
Quantity As an Independent Variable (QAIV)	X	X	X	
Prototypes and Step-Up/Step-Down Factors	X			

Regression Analysis

Regression Analysis TOPIC	CCEA®			
	Part I or PCEA®		Part II	
	Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Linear Relationships	X			
Correlation	X	X	X	
Causation	X			
Types of Models	X			
General Linear Model	X	X	X	X
Linear Regression	X	X	X	X
Assumptions for Linear Regression Models	X			
Finding the Equation		X	X	
<i>Residual Analysis</i>		X	X	
<i>Cook's Distance Measure (Identify Influential Observations)</i>		X	X	
Goodness of Fit	X	X	X	
<i>Analysis of Variance (ANOVA)</i>	X	X	X	
SSR		X	X	
SSE		X	X	
SST		X	X	
<i>Uncertainty</i>		X	X	
Standard Error		X	X	
Coefficient of Variation (CV)		X	X	
<i>Statistical Significance</i>		X	X	
Significance Level		X	X	
t statistic		X	X	
F statistic		X	X	
Mean Square Error (s-squared or MSE)		X	X	
<i>Explained Variation</i>		X	X	
R-squared		X	X	
Confidence Intervals	X	X	X	
<i>Prediction Intervals</i>		X	X	
<i>Point Estimation</i>		X	X	
<i>Small Sample Size Considerations in Regression Analysis</i>				X
Non-linear Models	X	X	X	X
Multivariate Regression Analysis	X	X	X	X
Least Squares Method		X	X	
Adjusted R-squared		X	X	
Multicollinearity		X	X	
<i>Signs of Multicollinearity</i>		X	X	
<i>Tests for Multicollinearity</i>		X	X	
Selecting the Best Model		X	X	X
Selecting "Within Type"		X	X	

Regression Analysis	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Selecting "Across Type"		X	X		
Generalized Least Squares		X	X		

Cost Risk Analysis

Cost Risk Analysis	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Risk Definitions	X				
Risk Process	X	X		X	
Risk and Uncertainty	X			X	
Relationship between Risk and Cash Flow	X				
Relationship between Risk and Profit	X				
Risk Management Structure				X	
Risk Assessment	X				
Risk Analysis and Sensitivity Analysis		X	X		
Risk Handling	X				
Risk Sources and Responsibilities	X			X	
Cost Growth	X				
Cost Growth Causes	X				
Cost Growth Allowances		X	X		
Types of Cost Risk	X			X	
Supportability Risk				X	
<i>Cost Estimating Risk</i>	X				
<i>Schedule/Technical Risk</i>	X				
Historical Cost Growth	X				
Variations Risk Distributions w/Impacts				X	
Triangles, Weibull, lognormals, and normals		X	X		
Risk Analysis vs. Sensitivity Analysis	X	X	X		
Independence and Cost Realism	X			X	
Risk and EVM		X	X		
Predicting EAC		X	X		
Methods and Techniques				X	
Bottom-up Approach	X				
Top Down Approach	X				
Schedule Risk Analysis	X	X	X		
Monte Carlo/Hyperlatin Cube	X	X	X	X	
Decision Tree Analysis	X	X	X	X	
Size Adjustments				X	
Risk Adjusted Net Present Value		X	X		

Cost Risk Analysis	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Adjusting for Total Project Risk	X	X	X	X	
Payback Approach	X	X	X		
Simulation Analysis	X	X	X		
Sensitivity Analysis	X	X	X		
Risk Adjusted Discount Rate Approach	X	X	X		
Functional, Relational, and Injected Correlation	X				
Risk Model Architecture		X	X	X	
Decision Process and Modeling				X	
Applying uncertainty to cost elements				X	
Selecting Distributions				X	
Inputs – Scoring/Parameters		X	X		
Inputs – Dollar Basis/Forecasting		X	X		
Structure – Organization		X	X		
<i>Coverage and Partition</i>		X	X		
<i>Assigning Cost to Risk</i>		X	X		

Probability and Statistics

Probability and Statistics	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Sampling Techniques	X				
Hypothesis Testing	X	X	X		
Probability Density Functions	X	X	X		
Probability Theory	X				
Expectation of a Random Variable	X	X	X		
Standard Deviation of a Random Variable	X	X	X		
Covariance and Correlation of a Random Variable	X	X	X		
Mean, Median, Mode, Range	X	X	X		
Cumulative Distribution Function	X	X	X		
Types of Distributions	X			X	
<i>Normal</i>	X	X	X	X	
<i>Student T</i>	X	X	X	X	
<i>Lognormal</i>	X	X	X	X	
<i>Chi Square</i>	X	X	X	X	
<i>F</i>	X	X	X	X	
<i>Triangular</i>	X	X	X	X	
<i>Uniform</i>	X	X	X	X	
<i>Beta</i>	X	X	X	X	
<i>Gamma</i>	X	X	X	X	

Probability and Statistics	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
<i>Weibull</i>	X	X	X	X	
<i>Exponential</i>	X	X	X	X	
<i>Other Common Distributions</i>	X			X	
Discrete Distributions	X			X	
<i>Bernoulli</i>	X			X	
<i>Binomial</i>	X			X	
<i>Poisson</i>	X			X	
<i>Geometric</i>	X			X	
Relationships between Distributions	X				
Hypothesis Testing	X	X	X	X	
Null Hypothesis and Alternative Hypothesis	X	X	X		
One-Tail vs. Two-Tail Tests	X	X	X		
Statistical Significance	X	X	X		
Type I and Type II Errors	X	X	X		
Test Statistic		X	X		
Critical Value		X	X		
P-Values		X	X		
Confidence Intervals	X	X	X		
Statistical Tests	X	X	X	X	
t test	X	X	X		
<i>One-sample</i>	X	X	X		
<i>Two-sample</i>	X	X	X		
Chi Square test	X	X	X		
F test	X	X	X		
k-Sample test for means	X	X	X		
Kolmogorov-Smirnov goodness of fit	X	X	X		
Related Topics					
Probability	X	X	X		
<i>Simulation</i>	X				
<i>Discrete-Event</i>	X				
<i>Time Series Analysis</i>		X	X		
<i>Moving Average</i>		X	X		
<i>Weighted Moving Average</i>		X	X		
<i>Exponential Smoothing</i>		X	X		

Manufacturing Cost Estimating

Manufacturing Cost Estimating	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Absorption Costing	X			X	
Burden	X			X	
Cost Center	X			X	
Differential Cost	X			X	
Fixed Cost	X			X	
Forward Pricing	X			X	
Incremental Cost	X			X	
Job Order Costing	X			X	
Marginal Cost	X			X	
Performance Factors	X			X	
Process Costing	X			X	
Variable Cost	X			X	
Composite Labor Rates	X	X	X	X	
Non-Recurring	X			X	
<i>Tooling</i>	X				
<i>Test Equipment</i>	X				
<i>Facilities</i>	X				
<i>Production Set-Up</i>	X				
Recurring	X			X	
<i>Labor</i>		X	X		
<i>Material</i>		X	X		
Overhead / Indirect / Capital Expenditures		X	X	X	
<i>Overhead</i>		X	X		
<i>Fringe</i>		X	X		
<i>General and Administrative (G&A)</i>		X	X		
<i>Cost of Money (COM)</i>		X	X		
<i>Fee</i>		X	X		
Labor Estimating	X			X	
Time Standards	X				
Personal Fatigue & Delay	X				
Support Labor	X				
Labor Concerns	X				
<i>Learning Curve</i>	X	X	X		
<i>Production Breaks</i>	X	X	X		
<i>Green Labor</i>	X				
<i>Process Improvements</i>	X				
<i>Equipment Utilization Rate</i>	X				
<i>Make or Buy</i>	X				

Manufacturing Cost Estimating	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Rates Estimating	X				
Material Estimating	X			X	
Material Costs	X				
<i>Raw Material</i>	X				
<i>Purchased Parts</i>	X				
<i>Subcontractor Costs</i>	X				
Types of Material	X				

Software Cost Estimating

Software Cost Estimating	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Software Development Process	X			X	
Comparison to Hardware	X				
Cost Drivers	X			X	
Size	X			X	
Source Lines Of Code (SLOC) <u>(New, Modified, Re-used, auto-generated)</u>	X			X	
Code Reuse and Equivalent SLOC (ESLOC)	X	X	X	X	
Equivalent Source Lines of Code (ESLOC)	X	X	X		
SLOC Growth	X				
How to capture effort on a project		X	X	X	
Productivity		X	X	X	
The elements of a complete development effort (SM, Requirements, Cost Unit Test, CSCI to CSCI test and integration, QM QA, Overall system integration and test, etc)	X				
Function Points	X	X	X		
Object Points	X				
Complexity	X				
Capability	X	X	X		
Schedule (Dr. Boehm's basic predicting equations)	X	X	X		
SW Maintenance	X				
Industry Rules of Thumb	X				
Life Cycle Methodologies	X			X	
<i>Waterfall</i>	X				
<i>Incremental</i>	X				
<i>Evolutionary</i>	X				
<i>Spiral</i>	X				
Estimating Techniques Applied to Software	X	X	X		
Industry Standards/Rules of Thumb	X	X	X	X	

Economic Analysis

Economic Analysis TOPIC	CCEA®			
	Part I or PCEA®		Part II	
	Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Discounted Dollars	X	X	X	
Economic Life	X	X	X	
Opportunity Cost	X	X	X	
Present Value of Money	X	X	X	
Time Value of Money	X	X	X	
Breakeven Analysis	X			X
Cost-Benefit Analysis	X			X
Discounting and Capital Budgeting	X			X
Principles of Economic Analysis (EA)	X			
Definition and Purpose	X			X
<i>Economic Life Cycle</i>	X			X
<i>Period of Analysis</i>	X			
<i>Type of Dollars</i>	X			
Constant Dollars		X	X	
Current Dollars		X	X	
<i>Base Year</i>		X	X	
Costs	X			
LCC	X			
Opportunity costs	X			
Status Quo phase-out costs	X			
Sunk costs	X			
Wash costs	X			
<i>Benefits</i>	X			
Compare and Rank Alternatives			X	X
<i>Time Phasing</i>		X	X	
<i>Base year v. Current year</i>		X	X	
<i>Compound V. composite rates</i>		X	X	
<i>Inflation</i>		X	X	
<i>Discounting</i>		X	X	
Present Value		X	X	
Real Discount Rates	X			
Nominal Discount Rates	X			
Discount Factors (mid-year and end-of-year)	X			
Comparison Techniques		X	X	
Net Present Value (NPV)		X	X	X
Uniform Annual Cost (UAC)		X	X	
Benefit/Cost Ratio (B/CR)		X	X	
Savings/Investment Ratio (SIR)		X	X	
Payback Period Analysis		X	X	
Return on Investment (ROI)		X	X	

Economic Analysis	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
<i>Benefit to Investment Ratio (BIR)</i>		X	X		
<i>Break-Even Analysis</i>		X	X		
Test Sensitivity of Alternative Rankings				X	

Contract Pricing

Contract Pricing	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Allowable Costs	X			X	
Ceiling Price	X			X	
Fee	X			X	
Not-to-Exceed Cost	X			X	
Profit		X	X	X	
Revenue	X			X	
Contract End Items		X		X	
Fixed Price		X	X	X	
<i>Firm Fixed Price (FFP)</i>		X	X		
<i>Fixed Price Incentive (FPI)</i>		X	X		
<i>Firm and Successive Targets</i>		X	X		
<i>Ceiling Price</i>		X	X		
<i>Point of Total Assumption (PTA)</i>		X	X		
<i>Share Ratios</i>		X	X		
Cost Plus		X	X	X	
<i>Cost Plus Award Fee (CPAF)</i>		X	X		
<i>Cost Plus Incentive Fee (CPIF)</i>		X	X		
<i>Minimum and maximum fee</i>		X	X		
<i>Cost Plus Fixed Fee (CPFF)</i>		X	X		

Earned Value Management

Earned Value Management	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
EVMS Purpose and Benefits	X				
EVM Components	X			X	
Integrated Baseline	X				
<i>Resource-Loaded Schedule = Time-Phased Budget</i>	X				
<i>Work Breakdown Structure (WBS)</i>	X				

Earned Value Management	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
<i>Organizational Breakdown Structure (OBS)</i>	X				
<i>Performance Measurement Baseline (PMB)</i>	X				
<i>Management Reserve (MR)</i>	X				
<i>Contract Budget Base (CBB)</i>	X				
Earned Value Data Elements	X			X	
(BCWS) <i>Planned Value (PV) = Budgeted Cost of Work Scheduled</i>		X	X		
(BCWP) <i>Earned Value (EV) = Budgeted Cost of Work Performed</i>		X	X		
<i>Actual Cost (AC) = Actual Cost of Work Performed (ACWP)</i>		X	X		
<i>Budget At Complete (BAC)</i>		X	X		
<i>Latest Revised Estimate (LRE)</i>		X	X		
<i>Cost Variance (CV)</i>		X	X		
<i>Schedule Variance (SV)</i>		X	X		
<i>Estimate At Complete (EAC)</i>	X				
<i>Variance At Complete (VAC)</i>	X				
<i>To-complete Cost Performance Index (TCPI)</i>	X				

Cost Management

Cost Management	CCEA®				
	TOPIC	Part I or PCEA®		Part II	
		Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
Design-to-Cost	X				
Design of Experiment	X				
Measures of Effectiveness	X			X	
Cost-Effectiveness Analysis	X			X	
Cost-Performance Tradeoff Analysis	X			X	
Objectives of Cost Management	X				
Total Ownership Cost (TOC)	X			X	
Life Cycle Costing	X				
Linked Indirect Costs	X				
TOC Reduction and Cost Management	X				
Cost As an Independent Variable (CAIV)		X	X	X	
CAIV Definition	X				
Cost/Performance Trades	X				
<i>Linkage</i>	X				
<i>Exchange Rate</i>	X				
<i>Dominance</i>	X				
<i>"Bang for the buck"</i>	X				
Role of Cost Estimating	X				

Cost Management TOPIC	CCEA®			
	Part I or PCEA®		Part II	
	Foundational Knowledge	Practical Application	Advanced Analysis	Case Study
<i>Performance Estimating Relationships (PERs)</i>	X			
Target Costing	X			
Evolution of Target Costing	X			
Target Costing Definition	X			
<i>Price led</i>	X			
<i>Customer focused</i>	X			
<i>Design centered</i>	X			
<i>Cross functional</i>	X			
<i>Life-cycle oriented</i>	X			
<i>Value-chain based</i>	X			
Target Costing vs. CAIV		X	X	
Target Costing Tools	X			
Benefits of Target Costing	X			
Activity Based Costing (ABC)		X	X	X
ABC Model		X	X	
<i>Resources</i>		X	X	
<i>Activities</i>		X	X	
<i>Outputs (Cost Objects)</i>		X	X	
ABC and Activity-Based Management (ABM)		X	X	