

Scandinavian Academy Training Center

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Course: Project Cost Estimating Skills: Planning for Performance Excellence II

Code	City	hotel	Start	End	price	Language - Hours
PM-321SA	Abha	Hotel Meeting Room	2027-07-04	2027-07-15	22450 SR	En - 50

The Course

One of the most important phases in the success of project development is the planning phase. That’s why the management of a project begins at this critical phase where exceptionally realistic time and cost estimates are most needed to help the project manager realize the project’s deliverables. Good project planning not only saves time and money, but also increases the overall earned project value (quality, reliability, safety, etc.) for the amount of funding expended.

This course is comprised of three modules which can be booked as a training event, or as individual courses; Module 1 presents and examines the principles, tools and techniques used to develop schedules for both time and resources; Module 2 covers basic and advanced cost estimation techniques as well as the impact of risks that need to be considered to ensure the plan predicted is valid; and Module 3 Module presents and examines the implementation of the Value Engineering (VE) concept for maximizing project functionality, reliability and quality at the lowest possible cost.

The Structure

Module 1 - Project Scheduling & Contingency Planning Skills

Module 2 - Project Cost Estimating Skills

Module 3 - Value Engineering Skills

The Goals

Following the completion of this course, delegates will:

- Gain knowledge of techniques used in project estimating, from the conceptual stage to the final detailed estimate
- Understand the different types of estimates used to accurately and progressively estimate project costs
- Understand the different types of contracts based on the distribution of risk between contracting parties
- Gain knowledge of techniques used in resource planning and control
- Understand the time-cost trade-offs
- Identify risk sources and minimize their impact and learn how to sustain project momentum
- Learn how to administer project documentation and reporting
- Develop effective performance monitoring and control system
- Effectively apply incentive arrangements to get the best results from the contract
- Gather and organize information and cost relevant to the design aspects of the project
- Demonstrate better understanding of the key functions performed by key components of the design
- Critically assess and evaluate the relationships among key attributes such as cost, value and function
- Report effectively to top management and project stakeholders in the context of proposing new design alternatives that improve the overall project value
- Demonstrate proficiency in applying life-cycle costing principles
- Objectively present a convincing case in support of certain design alternatives

The Process

The course is a mixture of speaker input, case studies and practice exercises which will be used to facilitate group discussion. Delegates will gain detailed knowledge of cost

estimation and value engineering concepts and techniques by active participation in the exercise/training sessions. Through lectures, case studies and practical exercises, delegates will focus on key concepts, terms, and principles necessary for realistically estimating, controlling and optimizing project costs.

The Benefits

This course will provide delegates with a proven set of critical skills and techniques for the development a systematic and dynamic project schedule, reliable cost estimate, as well as the ability and skills to compare the costs of alternative strategies or technical approaches to ensure the most economical project at the desired level of quality.

The Results

Individuals and organisations will be better prepared in relation to how to manage the schedule, cost and design of their projects according to best practices. Individuals will learn how to adopt and apply a structured approach to time and cost estimation, budgeting and value engineering. This in turn will lead to having a consistent and streamlined schedule, cost and design management processes across the organisation.

The Core Competencies

Delegates attending this course will enhance their competencies in the following areas:

- Ability to deliver projects on time and within budget
- Understanding of what it takes to be a successful project manager
- Skill and confidence to plan and control projects successfully and ability to sidestep the most common project management pitfalls and problems
- Appreciation of the philosophy, framework, standards and approaches to the delivery of the projects

- Developing an initial project budget for the owner
- Determining project feasibility
- Designing the project within the owner`s budget
- Evaluating alternative design concepts and project components
- Preparing bids & cost proposals
- Establishing project budgets
- Determining the cost impacts of change orders
- Developing appreciation of how to frame decisions and to develop decision hierarchies
- Bringing Value Engineering into the organization’s business planning process
- Identifying major roadblocks to creativity, and ways to mitigate them
- Evaluating the results of a brainstorming session to develop the best value-adding scenario
- Adhering to a structures sequence of logical steps to solve problems that eliminate unnecessary costs without compromising quality or functionality

The Programme Content

Module 1:

Project Scheduling & Contingency Planning Skills

Project Scope Planning and Definition (Fundamentals)

- Scope Planning
- Work Breakdown Structures (WBS)
- Work Packages
- Statement of Work (SOW) - Technical Baseline
- Scope Execution Plan
- Triple Constraints - Time Cost, Scope

- Project Quality Issues
- Project Risk Analysis
- Project Deliverables
- Resource Requirements

Project Schedule Planning and Critical Path Method

- Precedence Network Diagramming
- Job Logic Relationship Chart
- Critical Path Analysis
- Project Float Analysis
- Lead and Lag Scheduling
- Activity Duration Estimation
- Milestone Charts
- Gantt Chart - Schedule Baseline
- Project Estimating Processes
- Production and Productivity Planning
- Resource and Cost Allocation

Resource Allocation and Resource Levelling

- Management of Resources
- Planning and Scheduling Limited Resources
- Resource Allocation Algorithms for Resource Prioritisation
- Solving Resource Contention
- Resource Levelling when Project Duration is Fixed
- The Brooks Method of Resource Allocation
- Increasing the Workforce
- Solving Interruptions to the Schedule
- Scheduling Overtime

Accelerating the Project Schedule

- Circumstances Requiring Project Acceleration
- Time-Cost-Scope Trade-off
- Project Time Reduction
- Direct Project Costs
- Indirect Project Costs
- Options for Accelerating the Schedule
- Crashing the Schedule - How?
- Pre-Accelerated Schedule
- Developing a Crash Cost Table
- Acceleration in Practice
- The Optimal Acceleration Point
- Gantt Chart for Accelerated Schedule
- Network Activity Risk Profiles
- Additional Considerations
- Multiple Critical Paths
- Project Cost Reduction

Project Contingency Planning

- Program Evaluation and Review Technique (PERT)
- Path Convergence Analysis
- Solving the Path Convergence Problem
- Network Risk Profile Types
- Normal Distribution
- PERT, Probability and Standard Deviation Formulae
- Calculating the Standard Deviation
- Standard Deviation for Critical Path
- Z-Values: The Probability of Project Completion at a Required Date
- True Critical Path
- Network Activity Risk Profiles
- Application: Estimating Project Duration

Line of Balance Scheduling - The Planning of Recurring Activities

- Preparing a Line of Balance Schedule
- Velocity Diagrams and Linear Scheduling
- Velocity Diagram Production Rate Calculations
- Linear Sequence of Activities as a Series of Velocity Diagrams
- Balancing the Schedule
- Calculations for a Line of Balance Schedule
- Line of Balance Formulae
    - Target Units per Week
    - Determining Crew Size
    - Actual Rate of Output
    - Time to Complete One Activity
    - Elapsed Time for Recurring Activity
- Slope of Line from Activity Start to Activity Finish
- Balanced Project Schedule without Buffers (Finish-Start)
- Inserting Buffers
- Comparison of Unbalanced with Balanced Schedules
- Measuring Planned Progress on Schedule
- Velocity Diagram Reflecting Expected Conditions
- Actual Progress and Work Conditions
- Variable Conditions

Project Execution Management, Control and Reporting

- Progress Tracking and Monitoring
- Project Cost Management
- Earned Value Control Process
- Schedule Variances
- Cost Variances
- Progress Control Charts - Trend Analysis
- Schedule and Cost Variance Forecasting
- Labour Management and Cost Control
- Materials Management and Cost Control
- Earned Value Analysis

- Earned Value Reporting

Project Recovery Plan Development

- Project Variance Analysis and Quantification
- Schedule Performance Index (SPI)
- Cost Performance Index (CPI)
- Setting Schedule and Cost Control Limits
- Project Recovery Data Assessment
- Schedule and Cost Recovery Analysis
- Schedule and Cost Recovery Plan
- Project Recovery Baselines and Controls

Module 2:

Project Cost Estimating Skills

Cost Estimating Basics

- The estimating life cycle
- Phases of the Design Process
    - Programming phase
    - Schematic design
    - Design development
    - Construction documents
- Estimating accuracy by phase
- Conceptual Cost Estimates
- Rough Order of Magnitude Estimates (Broad Scope Estimates)
- Assemblies cost estimates
- Cost indices

- Semi-detailed Estimates (Narrow Scope Estimates)
- Definitive Estimates (Detailed Scope Estimates)
- Basic procedures
- Lump-sum contracts
- Unit-price contracts
- Cost-plus contracts
- Cost-plus contract with guaranteed maximum price (GMP)
- Time-and-materials contracts
- Bid method
- Negotiated method
- Quantity take-off
- Types of construction contracts
- Procurement methods
- Pre-construction services
- Risk analysis and contingencies

Broad Scope Cost Estimating Techniques

- Adjustments to Project Cost for Broad Scope Estimates
- PERT Project Cost Analysis
- PERT Unit Cost Estimates
- Formulae for Cost Estimating
- The Normal Distribution Curve
- Z-Value Table
- The Probability of Project Completion within Budget
- Estimating Project Unit Cost by Using the Standard Deviation
- Estimating the Project Unit Cost at a Required Probability
- The Probability of Completing the Project at a Required Cost
- PERT vs. Standard Deviation & Z-Values
- Adjustments to Estimates Based on Previous Projects
- Adjustments for Time
- Review: Future Value of Money
- Review: Present Value of Money

- Equivalent Annual Interest Rate
- Index to Adjust for Time
- Equivalent Compound Interest
- Location Index for Construction
- Adjustments for Location
- Adjustments for Size
- Combined Adjustments
- Economic Price Adjustment
- Estimating Durations based on the Learning Curve Effect
- Estimating Costs based on the Learning Curve Effect
- Unit-Cost Adjustments
- Learning Curves

Budget Estimating Process

- Estimating by design phase
- Programming budget estimates
- Schematic design budget estimates
- Design development budget estimates
- Estimating pre-construction services
- Request for proposal
- Development of pre-construction services estimate
- Pre-construction services contract
- Budget control log

Bid Contract Estimating Process

- Pre-estimate activities
- Estimating process
- Solicitation of lump-sum bids
- Order-of-Magnitude estimates
- Work Breakdown Structure
- Estimating team

- Scheduling the estimating work
- Subcontractors and major suppliers
- Estimating forms
- Accuracy and error prevention
- Pricing self-performed work
- Recap sheet
- Materials
- Labour
- Applying pricing factors
- Summary recap
- Subcontractor work
- Project summary schedule
- Alternative techniques
- Elements of the general conditions estimate
- Final document review
- Completing the bid summary
- Final mark-ups
- Sales tax
- Validating the estimate
- Estimating subcontractor work
- Estimating General Conditions
- Completing the estimate

Unit Price Estimates

- Unit price bid forms
- Direct cost estimation
- Materials
- Labour
- Indirect labour
- Subcontractors
- Recap summary sheet
- Direct-to-indirect cost factor

- Mark-up determination
- Variation-in-quantity contract provision
- Risk analysis
- Bid finalisation

Negotiated Contract Estimating

- Guaranteed Maximum Price Estimates
    - Contract procurement process
    - Documents
    - Strategies
    - Estimating process
    - Contingencies
- Fee determination for negotiated contracts
- Reimbursable versus Non-reimbursable costs
- Home office overhead
- Risk evaluation
- Fee structure
- Cost savings split
- Strategies for responding to the Request for Proposal
- Documents to be included with the Request for Proposal
- General Contractor interview and selection process
- Negotiated subcontracts
- Cost proposals for negotiated contracts

Contract Types and Compensation Arrangements

- Risk distribution in contracting
- Project risk profiles
- Contract types according to risk distribution
- Fixed Price Contracts
- Firm Fixed Price
- Fixed Price with Economic Adjustment

- Incentive Contracts
- Fixed Price Incentive
- Cost Plus Incentive
- Cost Reimbursement
- Cost Plus Award Fee
- Cost Plus Fixed Fee
- Cost-Plus Contracts
- Time-and-Materials

Narrow Scope Cost Estimating Techniques

- Power-sizing techniques (Capacity Ratios)
- Factor estimates
- Cost estimating relationships (CER)
- Design-to-cost-estimates
- Target cost estimates
- Adjusting for Project Type and Quality Level
- Features Determining the Quality Level (Grade) of a Structure
- Adjusting for Quality Level by Using a Costing Publication
- Economic Constraints
- Parametric Cost Estimating
- Analysis of Estimating Accuracy

Module 3:

Value Engineering Skills

Framework for Applying Value Engineering in Projects

- What is Value Engineering? Why is it important?

- Defining Value Engineering concepts and principles
- Purpose of Value Engineering and Value Analysis
- Strengths and Weaknesses of Value Engineering
- How and When is Value Engineering applied?
- Project definition and initiation
- Project scope and charter development
- Life-cycle costing techniques
- Project stakeholders analysis and management
- Identifying relationships between Value, Cost and Worth
- Initiating Value Engineering Process
- Overview of Different Value Engineering Phases
- The Information Phase – steps and procedures
- Developing Value Engineering Job Plan

The Function Analysis Phase - Expressing Project Functional Needs and Constraints

- The need for Function Analysis in projects
- Defining project constraints – relationships and tradeoffs
- Conceptual project cost estimating techniques
- Function-Cost-Worth Analysis
- Developing FAST Diagrams to identify critical project components
- The Technical FAST Model to perform project value analysis
- Case Study
- Cross-Functional Project Team Approach

The Creative Phase - Inspiring Creativity in Your Project Team

- Creativity and Creative thinking within the project environment
- Individual vs. Group thinking to improve the quality of project decisions
- Creativity techniques as applied to optimize project value
- Blocks to creativity within the project team
- Brainstorm project solutions

- Reaching consensus and leveraging the power of project team collaboration
- Project risk perception and identification
- Project prioritization process using the Delphi technique
- The use of Force-field analysis in project problem solving
- Output of the Creative Phase

The Evaluation Phase -Making Informed Project Decisions

- Project ideas screening
- Project evaluation methods
- Quantitative evaluation using objective data
- Subjective evaluation – project-related criteria weighting
- Revisiting project life-cycle costing analysis
- Incorporating inflation in project economic analysis
- Performing project risk and scenario analyses
- Risk Life-cycle simulation modelling - best and worst project cost scenarios
- Pitfalls associated with the use of existing economic models
- Incremental benefit-cost analysis for project evaluation
- Effective Decision-making in project environment
- Output of the Evaluation Phase

The Planning and Reporting Phases -Getting Results through Effective Communication

- Develop and assess VE proposals to optimize project value
- Develop action plans and assign project roles and responsibilities
- Reporting VE findings to Senior Management and project stakeholders
- Mastering oral presentation techniques & interpersonal skills
- Strategies for project plan execution
- Incorporating VE into the early project phases
- Integrating VE with Continuous Improvement Techniques
- Wrap-up

The Scandinavian Academy for Training Center adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training Center.

Program Timings: 9:00 AM to 2:00 PM

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.
- A closing ceremony on the final day to distribute certificates and celebrate participants achievements.
- **Note: All prices are exclusive of 15% Value Added Tax (VAT).**

Our Success Partners

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