CONCEPT

Project Planning and Scheduling: Critical Path Method (CPM) and Schedule Analysis



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Technical depth: Practitioner · **Practical mode:** Modelling build

Introduction

Many projects miss their dates not because the work is hard but because the schedule was never a working model: activities lack logic, float is misread, resources are overloaded and the critical path shifts unnoticed. Sponsors then receive completion dates that cannot be defended. This Core Concept course builds the planning and scheduling competence to create logic-driven, resource-loaded schedules, identify the true critical path and test the dates they produce. Participants work through cases from several sectors and leave with a Baseline Schedule Model for a project of their own.

Course Objectives

- Structure project scope into a work breakdown structure and WBS dictionary that support scheduling and control
- Build a logic-linked network schedule with the Precedence Diagramming Method and calculate the critical path, total float and free float
- Estimate activity durations with three-point and productivity-based methods, load resources and level them to remove overallocation
- Assess schedule quality against a recognised health check and critical path practice, correcting logic, constraint and float defects
- Compress, update and re-baseline a schedule, and state completion dates at a defined confidence level using Monte Carlo simulation
- Produce a Baseline Schedule Model with a schedule basis document ready for sponsor or client approval

Target Audience

- Project planners and schedulers who build and maintain schedule models
- Project managers responsible for delivery dates and schedule baselines
- Project controls staff who record progress and report schedule variance
- Engineers and technical leads who estimate durations and sequence work packages
- PMO managers and analysts who review and consolidate schedules across multiple projects
- Contract and commercial managers who assess time impacts and extension of time requests

Course Outline

Day 1: Planning Foundations and Scope Structure

- Project Life Cycle and Planning Approach Under ISO 21502
- Schedule Performance Domain in the PMBOK Guide Eighth Edition
- Work Breakdown Structure Development to ISO 21511
- WBS Dictionary and Control Account Definition
- Schedule Maturity Review Using the PMI Practice Standard for Scheduling Conformance Assessment

Day 2: Network Scheduling Methods and Standards

- Precedence Diagramming Method: FS, SS, FF and SF Relationships
- Critical Path Method Forward and Backward Pass Calculation
- Total Float and Free Float Interpretation
- PERT Three-Point Estimating and the Beta Distribution
- Critical Chain Method and Buffer Management

Day 3: Building and Resourcing the Schedule

- Activity Definition and Duration Estimating from Productivity Rates
- Leads, Lags and Constraints in Primavera P6 and Microsoft Project
- Resource Loading and Histogram Analysis
- Resource Levelling and Resource Smoothing Techniques
- Milestone Schedule and Gantt Chart Reporting Formats

Day 4: Schedule Quality, Control and Risk

- Critical Path Identification to AACE Recommended Practice 49R-06
- 14-Point Schedule Quality Health Check
- Schedule Compression: Crashing and Fast-Tracking Cost-Time Trade-Off
- Baseline Updating, Progress Measurement and Schedule Variance Analysis
- Schedule Risk Analysis with Monte Carlo Simulation and P50 and P80 Dates

Day 5: Modelling Build and the Baseline Schedule Model

- Infrastructure Project Case: Network Build and Critical Path Calculation
- Digital Transformation Case: Resource-Constrained Rescheduling
- Baseline Schedule Model Build for an Own Project
- Schedule Basis Document and Float Analysis Drafting
- Peer Schedule Review and Model Defence

Skills You Will Gain

- Work Breakdown Structuring
- Network Logic Development
- Critical Path Calculation
- Duration Estimating
- Resource Levelling
- Schedule Quality Assurance
- Schedule Compression Analysis
- Probabilistic Schedule Forecasting

Why Attend This Course

- Return to work with a Baseline Schedule Model for a live project, its critical path and float already tested by peers
- Spot the missing logic, hard constraints and negative float that make a schedule's dates unreliable
- Give sponsors a completion date with a stated confidence level instead of a single optimistic date
- Compare planning practice with professionals scheduling construction, technology and public service projects in other countries

Conclusion

A schedule earns trust only when its logic is complete, its durations are grounded in evidence and its critical path can be explained. This course moves from scope structure and network methods, through resource loading and levelling, to the quality checks, compression options and risk analysis that keep dates realistic. The final day turns that material into a Baseline Schedule Model that participants take back to their project, giving them a defensible basis for every date they commit to and every variance they report.