



COURSE OVERVIEW FM0365 **Cost Risk Analysis & Monte Carlo Simulation**

Course Title

Cost Risk Analysis & Monte Carlo Simulation

Course Date/Venue

September 20-24, 2026/TBA Meeting Room,
Royal Tulip Muscat, Oman

Course Reference

FM0365

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of Cost Risk Analysis & Monte Carlo Simulation. It covers the purpose and importance of cost risk analysis; the relationship between cost estimating and risk management; the cost estimate structure and classification, base estimate development and validation; the cost uncertainty, cost risk and qualitative cost risk assessment; the cost risk analysis framework, quantitative risk analysis fundamentals and probability and statistics for cost risk; the probability distribution selection, cost uncertainty ranges and discrete risk events; and the correlation and dependency, Monte Carlo simulation fundamentals and Monte Carlo cost model.



During this interactive course, participants will learn to run the simulation, interpret simulation outputs and apply sensitivity and risk driver analysis; the Monte Carlo model validation, cost contingency analysis, confidence levels and cost targets; the integrated cost, schedule risk and advanced correlation modeling; the scenario and what-if analysis, risk mitigation and cost optimization; the complete cost risk model, cost risk results and risk-based contingency; and the cost risk information and cost analysis for decisions.



Course Objectives/Outcomes & Benefits for the Participants

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on cost risk analysis and monte carlo simulation
- Discuss the purpose and importance of cost risk analysis including the relationship between cost estimating and risk management
- Carryout cost estimate structure and classification as well as base estimate development and validation
- Identify cost uncertainty and cost risk and apply qualitative cost risk assessment
- Recognize cost risk analysis framework, quantitative risk analysis fundamentals and probability and statistics for cost risk
- Apply probability distribution selection, develop cost uncertainty ranges and quantify discrete risk events
- Discuss correlation and dependency, Monte Carlo simulation fundamentals and build a Monte Carlo cost model
- Run the simulation, interpret simulation outputs and apply sensitivity and risk driver analysis
- Employ Monte Carlo model validation and cost contingency analysis and discuss confidence levels and cost targets
- Explain integrated cost and schedule risk, advanced correlation modeling, scenario and what-if analysis including risk mitigation and cost optimization
- Develop a complete cost risk model, analyze cost risk results and establish risk-based contingency
- Communicate cost risk information and use cost analysis for decisions

Exclusive Smart Training Kit - H-STK®



*Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of cost risk analysis and Monte Carlo simulation for project directors and project managers, project controls managers and project controls engineers, cost managers and cost engineers, cost estimators and estimating managers, risk managers and risk engineers, planning managers and planning engineers, finance managers and financial analysts, budget managers and budget analysts, commercial managers and commercial analysts, contract managers and contract engineers, quantity surveyors and cost consultants, business planning and strategy managers, investment and portfolio managers, engineering managers and project engineers, procurement and supply chain managers, project management office (PMO) professionals, decision analysis and business risk professionals, and professionals responsible for cost forecasting, risk quantification, contingency assessment, and project investment decisions.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations: -

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

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The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Fee

US\$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.





Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. Alex Hardy, MBA, BA (Honours), CFA, is a **Senior Financial Analyst** with over **20 years** of extensive experience in the areas of **Financial Modelling, Financial & Sales Reporting, Forecasting & Budgeting, Commercial Tariff Design, Tariff Components & Pricing Structures, Pricing Strategy, Tariff Optimization Techniques, Big Data Analysis & Finance/Operations, FP&A & Capital-raising, Leveraging Public & Private Markets, Managerial Economics, Marketing, Technology & Innovation Strategy, Real Estate & Social Finance, Corporate Valuation, Entrepreneurial Finance, International Financial Management, Private Equity, Variance Analyses & Cash Flow Forecasting, Demand Analysis, Bookkeeping, New Acquisition Integration, Minority-Investor Buyouts & Ongoing Cash Flow Forecasting, Compliance & Portfolio Accounting, Treasury & Investor Relations, Sales Performance Presentations, Market Penetration Rates & Revenue Outcomes, Online Wealth Management, Blog Monetization & Social Gaming, Cashflow Forecasting & Liquidity Management, Budgeting & Estimation Skills, Budgeting & Cost Control, Accounting Principles and Business Valuation.**

During his career life, Mr. Hardy has gained his practical and field experience through his various significant positions and dedication as the **Senior Director, Principal, Senior Finance Manager, Finance Manager, Senior Financial Analyst, Business Analyst, Research Analyst & Chief Compliance Officer** and **Strategy Intern** from various companies such as the Whitman Capital, Viacom International Media Networks, Pulse Advisory, BBC Studios Americas, Sonar Entertainment, Red Arrow Studios, FTI Consulting and 12Data Consulting.

Mr. Hardy has a **Master of Business Administration (MBA)** and a **Bachelor of Arts (BA)** with Honours in **Political Science** from the **University of Oxford** and **Stanford University, USA**, respectively. Further, he is a Certified **Chartered Financial Analyst (CFA)** from the CFA Institute and has delivered numerous trainings, seminars, conferences and workshops internationally.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.





Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Sunday, 20th of September 2026

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Cost Risk Analysis Purpose and Importance of Cost Risk Analysis • Relationship Between Cost Estimating and Risk Management • Deterministic Versus Probabilistic Cost Estimates • Applications Across Projects and Capital Programs
0930 – 0945	Break
0945 – 1030	Cost Estimating Fundamentals Cost Estimate Structure and Classification • Direct, Indirect, Fixed, and Variable Costs • Base Estimate Development and Validation • Estimate Assumptions, Exclusions, and Limitations
1030 – 1130	Understanding Cost Uncertainty Definition and Sources of Cost Uncertainty • Aleatory Versus Epistemic Uncertainty • Estimating Uncertainty and Variability • Impact of Uncertainty on Project Cost Forecasts
1130 – 1215	Cost Risk Identification Systematic Identification of Cost Risk Events • Internal and External Sources of Risk • Risk Categories and Risk Breakdown Structures • Developing an Effective Cost Risk Register
1215 – 1230	Break
1230 – 1330	Qualitative Cost Risk Assessment Probability and Impact Assessment • Risk Scoring and Prioritization • Probability-Impact Matrices • Identifying Key Cost Risk Drivers
1330 – 1420	Cost Risk Analysis Framework Establishing Objectives and Analysis Boundaries • Defining the Cost Risk Model Structure • Data Requirements and Information Sources • Integrating Risk Analysis with Project Controls
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One

Day 2: Monday, 21st of September 2026

0730 – 0830	Quantitative Risk Analysis Fundamentals Objectives of Quantitative Cost Risk Analysis • Translating Qualitative Risks into Quantitative Inputs • Confidence Levels and Probability Concepts • Interpreting Probabilistic Cost Forecasts
0830 – 0930	Probability & Statistics for Cost Risk Mean, Median, Mode, and Expected Values • Variance and Standard Deviation • Percentiles and Confidence Intervals • Probability Density and Cumulative Distributions



0930 – 0945	Break
0945 – 1130	Probability Distribution Selection Normal and Lognormal Distributions • Triangular and Uniform Distributions • PERT and Beta Distributions • Criteria for Selecting Appropriate Distributions
1130 – 1215	Developing Cost Uncertainty Ranges Minimum, Most Likely and Maximum Estimates • Expert Judgment and Elicitation Techniques • Historical Data and Benchmarking • Calibrating Uncertainty Ranges
1215 – 1230	Break
1230 – 1330	Quantifying Discrete Risk Events Probability of Risk Occurrence • Estimating Cost Consequences • Expected Monetary Value Concepts • Modeling Threats and Opportunities
1330 – 1420	Correlation & Dependency Understanding Correlation Between Cost Elements • Causes of Cost Dependency • Correlation Coefficients and Matrices • Avoiding Unrealistic Aggregation of Uncertainty
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Two

Day 3: Tuesday, 22nd of September 2026

0730 – 0830	Monte Carlo Simulation Fundamentals Principles of Monte Carlo Simulation • Random Sampling and Iterative Calculations • Deterministic Versus Simulation-Based Models • Benefits and Limitations of Simulation
0830 – 0930	Building a Monte Carlo Cost Model Establishing the Base Cost Model • Assigning Probability Distributions • Incorporating Discrete Risk Events • Defining Model Assumptions and Parameters
0930 – 0945	Break
0945 – 1130	Running the Simulation Selecting the Number of Iterations • Random and Probabilistic Sampling • Simulation Convergence and Stability • Model Execution and Quality Checks
1130 – 1215	Interpreting Simulation Outputs Cost Probability Distributions • Cumulative Probability Curves • Understanding P-Values Such as P50 and P80 • Comparing Deterministic and Probabilistic Estimates
1215 – 1230	Break
1230 – 1330	Sensitivity & Risk Driver Analysis Sensitivity Analysis Concepts • Tornado Charts and Ranking Techniques • Identifying Dominant Cost Drivers • Prioritizing Risks for Management Attention



1330 – 1420	Monte Carlo Model Validation Checking Input Assumptions and Distributions • Reviewing Model Logic and Calculations • Testing Extreme and Boundary Conditions • Documenting Validation and Quality Assurance
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Three

Day 4: Wednesday, 23rd of September 2026

0730 – 0830	Cost Contingency Analysis Definition and Purpose of Contingency • Risk-Based Versus Percentage-Based Contingency • Determining Appropriate Contingency Allowances • Separating Contingency from Management Reserve
0830 – 0930	Confidence Levels & Cost Targets Understanding P10, P50, P80, and P90 • Selecting Confidence Levels for Decision-Making • Relationship Between Confidence and Contingency • Establishing Risk-Adjusted Cost Targets
0930 – 0945	Break
0945 – 130	Integrated Cost & Schedule Risk Relationship Between Schedule and Cost Uncertainty • Cost Consequences of Schedule Delays • Time-Dependent and Resource-Related Costs • Integrating Schedule Risk Outputs into Cost Models
1130 – 1215	Advanced Correlation Modeling Modeling Dependencies Between Cost Variables • Applying Correlation Matrices • Avoiding Double Counting of Correlated Risks • Testing Correlation Assumptions Through Sensitivity Analysis
1215 – 1230	Break
1230 – 1330	Scenario & What-If Analysis Developing Alternative Cost Scenarios • Testing Changes in Risk Assumptions • Evaluating Best-Case and Worst-Case Conditions • Comparing Mitigation and Response Strategies
1330 – 1420	Risk Mitigation & Cost Optimization Quantifying the Benefits of Mitigation • Comparing Mitigation Cost Against Risk Reduction • Evaluating Residual and Secondary Risks • Optimizing Contingency and Risk Response Decisions
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Four

Day 5: Thursday, 24th of September 2026

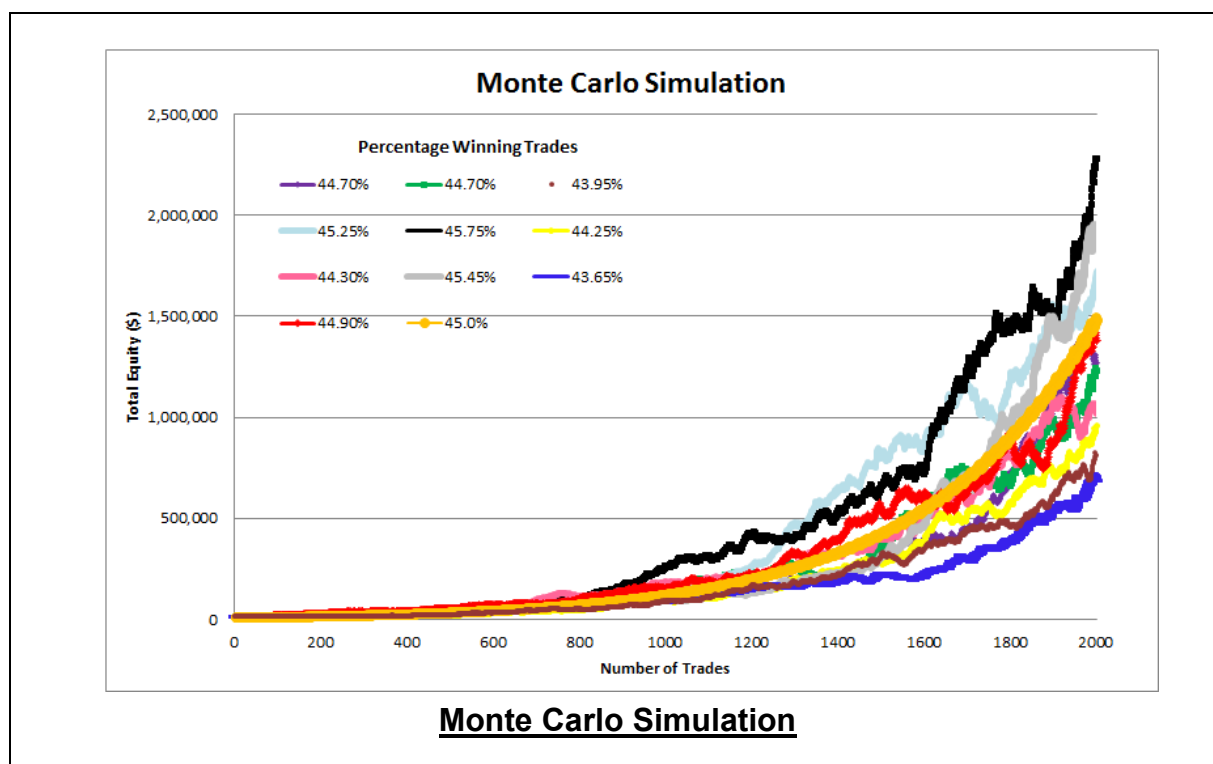
0730 – 0830	Developing a Complete Cost Risk Model Structuring the Cost Breakdown for Simulation • Incorporating Uncertainty and Discrete Risks • Applying Distributions and Correlations • Running and Validating the Integrated Model
0830 – 0930	Analyzing Cost Risk Results Interpreting Probability Distributions • Evaluating Confidence-Level Cost Estimates • Identifying Major Contributors to Cost Exposure • Distinguishing Uncertainty from Discrete Risk Impacts

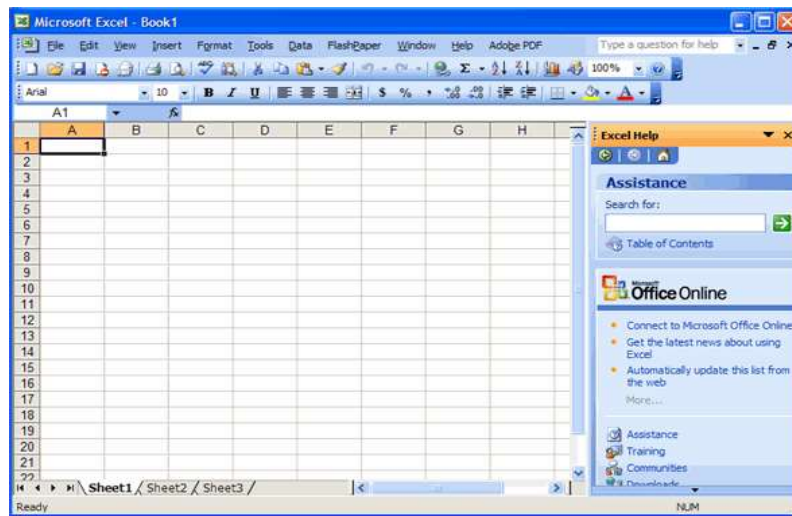


0930 – 0945	Break
0945 – 1030	Establishing Risk-Based Contingency Calculating Contingency from Simulation Outputs • Selecting Target Confidence Levels • Reconciling Contingency with Organizational Policy • Developing Contingency Drawdown Principles
1030 – 1130	Communicating Cost Risk Information Designing Effective Risk Analysis Reports • Presenting S-Curves and Tornado Charts • Explaining Probabilistic Results to Stakeholders • Communicating Uncertainty Without False Precision
1130 – 1215	Break
1215 – 1230	Using Cost Risk Analysis for Decisions Supporting Project Sanction and Investment Decisions • Comparing Project Alternatives Probabilistically • Setting Budgets and Funding Requirements • Applying Results to Forecasting and Cost Control
1230 – 1345	Practical Case Study & Workshop Building a Project Cost Risk Model • Performing Monte Carlo Simulation • Interpreting Simulation and Sensitivity Results • Presenting Recommendations and Management Conclusions
1345 – 1400	Course Conclusion Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course
1400 – 1415	POST-TEST
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using “Monte Carlo Simulation” & “MS-Excel” application.





MS-Excel

Course Coordinator

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