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Course program: Quantitative Risk Analysis (QRA)

EpiX Analytics

Day 1	Introduction to Quantitative Risk Analysis (QRA)
<i>Morning</i>	<p>Welcome and General Introduction</p> <p>Introduction to QRA</p> <ul style="list-style-type: none"> • Using data and knowledge in QRA as a useful decision-support tool • Principles and main steps of risk analysis • Qualitative, semi-quantitative, and quantitative approaches • Risk analysis and risk management
<i>Afternoon</i>	<p>What we should know about statistics for QRA</p> <ul style="list-style-type: none"> • Mean, mode, standard deviation, skewness, kurtosis, percentiles • Probability vs. population distributions, relative vs. cumulative, discrete vs. continuous • Graphical representations of risk events <p>Introduction to risk modeling software</p> <ul style="list-style-type: none"> • Monte Carlo simulation, @RISK/Risk Solver/Crystal Ball and Excel • Tutorial on the software tools • Calculation vs. simulation • Practical problems to solve <p>What distributions to use?</p> <ul style="list-style-type: none"> • Selecting the appropriate distribution • Exercises
Day 2	The foundations of QRA
<i>Morning</i>	<p>Stochastic processes – the basis of risk analysis</p> <p>Working with binary outcomes and percentages– the Binomial Process</p> <ul style="list-style-type: none"> • Binomial, beta, negative binomial and geometric distributions • Imperfect tests, machine failures, risk events, etc.; • Investment decisions, portfolio risks, imperfect tests, etc.; <p>Working with rates – the Poisson Process:</p> <ul style="list-style-type: none"> • Poisson, gamma, and exponential distributions • Modeling insurance claims, accidents, machine reliability, random outbreaks, etc. <p>Summing random variables - Central Limit Theorem and aggregate distributions</p>

<i>Afternoon</i>	<p>Inputs into a QRA Model</p> <p>Fitting distributions to data:</p> <ul style="list-style-type: none"> • Maximum Likelihood & Goodness Of Fit criteria; • Important assumptions • Difference between parametric and non-parametric fitting <p>The use of expert opinion:</p> <ul style="list-style-type: none"> • Interviewing techniques • Dealing with expert biases • Distributions to use • Differences in expert opinion
Day 3	Uses and Applications and
<i>Morning</i>	<p>Modeling correlations:</p> <ul style="list-style-type: none"> • Why including correlations is critical • Explanation of a variety of correlation techniques • Example and exercises <p>Presenting results and making decisions</p> <ul style="list-style-type: none"> • Decision-focus • What results and statistics are relevant (and which ones are not)
<i>Afternoon</i>	<p>Good practices in risk modeling</p> <p>Common mistakes and how to prevent them</p> <p>Stochastic Optimization</p> <ul style="list-style-type: none"> • Overview • Practical examples and exercise <p>Wrap up and review of course material.</p>