



ONLINE

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Alfonso Sahuquillo Lopez

has successfully completed

Modeling Risk and Realities

an online non-credit course authorized by University of Pennsylvania and offered through Coursera

COURSE  
CERTIFICATE



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Coursera has confirmed the identity of this individual and  
their participation in the course.



# Modeling Risk and Realities

University of Pennsylvania

## About this Course

Useful quantitative models help you to make informed decisions both in situations in which the factors affecting your decision are clear, as well as in situations in which some important factors are not clear at all. In this course, you can learn how to create quantitative models to reflect complex realities, and how to include in your model elements of risk and uncertainty. You'll also learn the methods for creating predictive models for identifying optimal choices; and how those choices change in response to changes in the model's assumptions. You'll also learn the basics of the measurement and management of risk. By the end of this course, you'll be able to build your own models with your own data, so that you can begin making data-informed decisions. You'll also be prepared for the next course in the Specialization.

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**Taught by:** Sergei Savin, Associate Professor of Operations, Information and Decisions  
The Wharton School



**Taught by:** Senthil Veeraraghavan, Associate Professor of Operations, Information and Decisions  
The Wharton School

<b>Basic Info</b>	Course 3 of 5 in the Business and Financial Modeling Specialization
<b>Commitment</b>	4 weeks of study, 1-3 hours/week
<b>Language</b>	English, <b>Subtitles:</b> Portuguese (Brazilian) Volunteer to translate subtitles for this course

 <b>How To Pass</b>	Pass all graded assignments to complete the course. 	
<b>User Ratings</b>	 4.6 stars	

## Syllabus

### WEEK 1

#### Week 1: Modeling Decisions in Low Uncertainty Settings

This module is designed to teach you how to analyze settings with low levels of uncertainty, and how to identify the best decisions in these settings. You'll explore the optimization toolkit, learn how to build an algebraic model using an advertising example, convert the algebraic model to a spreadsheet model, work with Solver to discover the best possible decision, and examine an example that introduces a simple representation of risk to the model. By the end of this module, you'll be able to build an optimization model, use Solver to uncover the optimal decision based on your data, and begin to adjust your model to account for simple elements of risk. These skills will give you the power to deal with large models as long as the actual uncertainty in the input values is not too high.

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 4 videos, 2 readings

1. **Video:** Course Introduction
2. **Video:** 1.1 How To Build an Optimization Model: Hudson Readers Ad Campaign
3. **Video:** 1.2 Optimizing with Solver, and Alternative Data Inputs
4. **Video:** 1.3 Adding Risk: Managing Investments at Epsilon Delta Capital
5. **Reading:** PDFs of Slides for Week 1
6. **Reading:** Excel Files for Week 1

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 **Graded:** Week 1: Modeling in Low Uncertainty Quiz

### WEEK 2



## Week 2: Risk and Reward: Modeling High Uncertainty Settings

What if uncertainty is the key feature of the setting you are trying to model? In this module, you'll learn how to create models for situations with a large number of variables. You'll examine high uncertainty settings, probability distributions, and risk, common scenarios for multiple random variables, how to incorporate risk reduction, how to calculate and interpret correlation values, and how to use scenarios for optimization, including sensitivity analysis and the efficient frontier. By the end of this module, you'll be able to identify and use common models of future uncertainty to build scenarios that help you optimize your business decisions when you have multiple variables and a higher degree of risk.

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 3 videos, 2 readings

1. **Video:** 2.1 High Uncertainty Settings, Probability Distributions, Uncertainty and Risk
2. **Video:** 2.2 Common Scenarios for Multiple Random Variables, Risk Reduction, and Calculating and Interpreting Correlation Values
3. **Video:** 2.3 Using Scenarios for Optimizing Under High Uncertainty, Sensitivity Analysis and Efficient Frontier
4. **Reading:** PDFs of Lecture Slides for Week 2
5. **Reading:** Excel Files for Week 2

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 **Graded:** Week 2: Modeling in High Uncertainty Quiz

### WEEK 3

## Week 3: Choosing Distributions that Fit Your Data

When making business decisions, we often look to the past to make predictions for the future. In this module, you'll examine commonly used distributions of random variables to model the future and make predictions. You'll learn how to create meaningful data visualizations in Excel, how to choose the the right distribution for your data, explore the differences between discrete distributions and continuous distributions, and test your choice of model and your hypothesis for goodness of fit. By the end of this module, you'll be able to represent your data using graphs, choose the best distribution model for your data, and test your model and your hypothesis to see if they are the best fit for your data.

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 4 videos, 2 readings



1. **Video:** 3.1 Data and Visualization: Graphical Representation
2. **Video:** 3.2, pt 1: Choosing Among Distributions: Discrete Distributions
3. **Video:** 3.2, pt 2: Choosing Among Distributions: Continuous Distributions
4. **Video:** 3.3 Hypothesis Testing and Goodness of Fit
5. **Reading:** PDFs of Lecture Slides for Week 3
6. **Reading:** Excel Files for Week 3

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**Graded:** Week 3: Choosing Fitting Distributions Quiz



## WEEK 4

### Week 4: Balancing Risk and Reward Using Simulation

This module is designed to help you use simulations to enabling compare different alternatives when continuous distributions are used to describe uncertainty. Through an in-depth examination of the simulation toolkit, you'll learn how to make decisions in high uncertainty settings where random inputs are described by continuous probability distributions. You'll also learn how to run a simulation model, analyze simulation output, and compare alternative decisions to decide on the most optimal solution. By the end of this module, you'll be able to make decisions and manage risk using simulation, and more broadly, to make successful business decisions in an increasing complex and rapidly evolving business world.

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4 videos, 2 readings

1. **Video:** 4.1: Modeling Uncertainty: From Scenarios to Continuous Distributions
2. **Video:** 4.2 Connecting Random Inputs and Random Outputs in a Simulation
3. **Video:** 4.3 Analyzing and Interpreting Simulation Output: Evaluating Alternatives Using Simulation Results
4. **Video:** Course Conclusion
5. **Reading:** PDFs of Lecture Slides
6. **Reading:** Excel files for Week 4

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**Graded:** Week 4: Using Simulations Quiz

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## How It Works

### GENERAL

#### How do I pass the course?

To earn your Course Certificate, you'll need to earn a passing grade on each of the required assignments—these can be quizzes, peer-graded assignments, or programming assignments. Videos, readings, and practice exercises are there to help you prepare for the graded assignments.

#### What do start dates and end dates mean?

Once you enroll, you'll have access to all videos, readings, quizzes, and programming assignments (if applicable). If you choose to explore the course without purchasing, you may not be able to access certain assignments. If you don't finish all graded assignments before the end of the course, you can reset your deadlines. Your progress will be saved and you'll be able to pick up where you left off.

#### What are due dates? Is there a penalty for submitting my work after a due date?

Within a course, there are suggested due dates to help you manage your schedule and keep coursework from piling up. Quizzes and programming assignments can be submitted late without consequence. However, it is possible that you won't receive a grade if you submit your peer-graded assignment too late because classmates usually review assignment within three days of the assignment deadline.

#### Can I re-attempt an assignment?

Yes. If you want to improve your grade, you can always try again. If you're re-attempting a peer-graded assignment, re-submit your work as soon as you can to make sure there's enough time for your classmates to review your work. In some cases you may need to wait before re-submitting a programming assignment or quiz. We encourage you to review course material during this delay.

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## Course 3 of Specialization

### Build Business and Financial Models

Use spreadsheet models to make data-driven financial decisions



### Business and Financial Modeling

University of Pennsylvania



[View the course in catalog](#)

## Related Courses



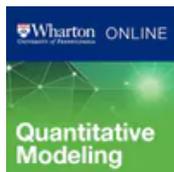
### Decision-Making and Scenarios

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### Introduction to Spreadsheets and Models

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### Fundamentals of Quantitative Modeling

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### Accounting Analytics

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### Operations Analytics

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