

The Chinese University of Hong Kong  
Faculty of Science  
Science Academy for Young Talent

Autumn Courses 2020  
Course Outline

*SAYT1006 Risk Management and Actuarial Science*  
*風險管理與精算學*

**Introduction:**

The uncertainty in an event or an activity is known as risk. Risks are encountered in trivial events such as travelling and in professional activities such as business partnership. We take risk every day. This course provides a broad perspective on both current practices and mathematical theories of risk management. Topics include qualitative and quantitative classifications of risks, mathematical modelling of financial markets and derivatives, current financial issues and crises, and statistical analysis of financial data, mathematics of insurance and Actuarial Science. This course is designed for the students who are interested in the scientific and mathematical aspects of risk management, financial market and actuarial science.

任何事件或活動的不確定性皆可視為風險。我們於日常中會遭遇到各項大大小小的風險。小如平日生活之衣食住行、大如商業之投機活動，風險總是伴隨左右。本課程為風險管理的實際應用和數學理論提供廣泛概要。本課程涵蓋範圍包括：風險的質化與量化分類，金融市場與衍生產品的數學建模，現今金融的課題與危機，金融數據的統計分析，保險數學與精算。本課程為有興趣於風險管理，金融市場或精算學之數理概念的同學而設。

**Medium of Instruction:** Cantonese supplemented with English

**Organising Unit:**

Department of Statistics, CUHK

**Teacher:**

Professor CY Yau

Department of Statistics, CUHK

Room 110, Lady Shaw Building, CUHK

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**Course Content:**

26 September 2020 (Saturday) 9:30am - 12:30pm 2:00pm - 5:00pm	<b><u>Lecture: Overview of Risk Management</u></b> <ul style="list-style-type: none"> <li>• Risk and management</li> <li>• Qualitative and quantitative aspects of risks</li> <li>• Mathematical and statistical measure of risks</li> <li>• Case studies and management tools</li> </ul> <b><u>Computer-lab Session: Introduction to R language and data acquisition</u></b>
3 October 2020 (Saturday) 9:30am - 12:30pm 2:00pm - 5:00pm	<b><u>Lecture: Modelling of Market and Financial Products – Part I</u></b> <ul style="list-style-type: none"> <li>• Stock prices and limit order market</li> <li>• Futures and options as financial derivatives for hedging and leverage</li> <li>• One-step binomial tree</li> <li>• No-arbitrage principle and risk-neutral probability</li> </ul> <b><u>Computer-lab Session: Simulation techniques for pricing derivatives</u></b>
10 October 2020 (Saturday) 9:30am - 12:30pm 2:00pm - 5:00pm	<b><u>Lecture: Modelling of Market and Financial Products – Part II</u></b> <ul style="list-style-type: none"> <li>• Vector and matrix operations</li> <li>• Portfolio allocation</li> <li>• Markowitz portfolio theory</li> </ul> <b><u>Computer-lab Session: Hedge fund manager case Study</u></b>
17 October 2020 (Saturday) 9:30am - 12:30pm 2:00pm - 5:00pm	<b><u>Lecture: Analysis of Credit Risk</u></b> <ul style="list-style-type: none"> <li>• Bankruptcy, liquidity and default Risk</li> <li>• Logistic regression analysis</li> <li>• Bassel Accords and stress testing</li> </ul> <b><u>Computer-lab Session: Data applications in credit card approval</u></b>
24 October 2020 (Saturday) 9:30am - 12:30pm 2:00pm - 5:00pm	<b><u>Lecture: Health and Environmental Risks</u></b> <ul style="list-style-type: none"> <li>• Life contingency table</li> <li>• Pricing insurance products</li> <li>• Survival modelling and actuarial theories</li> <li>• Spatial analysis of environmental hazards</li> </ul> <b><u>Computer-lab Session: Evaluation of insurance contracts &amp; HK forest fire map</u></b>
31 October 2020* (Saturday) 9:30am - 12:30pm 2:00pm - 5:00pm	Make-up class

<b>Duration</b>	5 whole day sessions (total 30 contact hours)
<b>Date</b>	26 September and 3,10,17,24 October 2020 31 October 2020* (make-up class)
<b>Time</b>	9:30am - 12:30pm; 2:00pm - 5:00pm
<b>Teaching Platform</b>	Online Teaching (ZOOM)
<b>Enrollment</b>	30
<b>Expected applicants</b>	Students who are promoting to or studying S4-S5 with good knowledge in mathematics, knowledge in economic is preferable but not necessarily
<b>Tuition Fee</b>	HKD 3,120.00 (Students who have attended all sessions will be granted a HKD 800 scholarship)
<b>Credit</b>	1 University Unit Certificates or letters of completion will be awarded to students who attain at least 75% attendance.

\* This date is reserved for make-up classes in case there is any cancellation of classes due to unexpected circumstances.