個別課程英文授課大綱

課程名稱 Course Title	(中文) R 運算與量化決策		
	(英文) R Computing & Quantitative Decision Making		
授課教師 Instructor	莊皓鈞老師	開課單位 Departments	資管系
學分數 Credit(s)	3	修課對象 Target Students	學士班、碩士班
課程目標 Course Objectives	This is a course in quantitative decision making for senior undergraduate and graduate students. Although the focus is applied computation, necessary theoretical aspects will be covered as well. My goal is to help students become proficient in probabilistic computing and risk analysis. After taking this course, students will be able to employ the introduced techniques to facilitate business decision making and conduct their own research.		
課程大綱 Course Description	1. R as a computing tool 2. Probability as a measure of uncertainty 3. Probabilistic distributions 4. Monte-Carlo simulation Computer programming will play a major role in this course. The default language for this course will be R (http://www.r-project.org/).		

上課進度
Weekly Course Schedule
	Outline of the course
	1. R as a computing tool
	  1.1 Summary statistics in R
	  1.2 Graphical displays in R
	  1.3 Functional programming in R
	2. Probability as a measure of uncertainty
	  2.1 Classical probability theory
	  2.2 Conditional probability
	  2.3 Bayes theorem and posterior probability
	  2.4 Probability and decision-making (e.g., reliability assessment)
	3. Probabilistic distributions
	  3.1 Random variables
	  3.2 Discrete distributions
	  3.3 Acceptance sampling
	  3.4 Continuous distributions
	  3.5 Queuing theory & Markov chains
	4. Monte-Carlo simulation
	  4.1 Generating random numbers
	  4.2 Parameter estimation
	  4.3 Simulating univariate probability distributions		

	4.4 Probabilistic forecasting 4.5 Modeling risk & business applications 4.6 Stochastic dependencies, optimization, & advanced simulation methods (if time permitted)
教學方式 Instructional Method	This is a lecture-based course. In each session I will give a detailed lecture about the essence of programming and modeling topics.
課程要求 Course Requirements	**Prerequisites** Introductory calculus and statistics. Also you must be willing to learn computer programming and interested in quantitative analysis. If you have any questions, talk to me.
評量方式 Evaluation	**Grading** *Homework*: 40% I will distribute 4 assignments (10% each) during the semester. While you are allowed to discuss homework questions with classmates, you must finish all assignments by yourself. *Midterm*: 30% I will explain the exam logistics in detail. *Term Project*: 30% (10% Presentation & 20% Written-Report) You have to form a group of **2 or 3** people to work on this project. The project will require you to identify a **decision problem** and apply technique(s) that you learn from this course. Before the end of this semester, each group will make an oral presentation about its project. The presentation should last no longer than 22 minutes and 5 extra minutes will be left for Q&A. Your group also needs to turn in a report written in ADEQUATE Chinese or English (**1.5 spacing; NO more than 15 pages**). The report should 1) articulate the problem, 2) explain the method/model you use to tackle the problem, 3) specify data source (if any), 4) present results of analysis, and 5) make recommendations to the decision-maker. You should occasionally discuss the term project with me during the semester.
教材及參考書目 Textbooks & Suggested Materials	**Texts** Lecture notes will be provided and NO textbooks are required. Below is a list of books I refer to: Baclawski 2008. *Introduction to Probability with R.* Horgan 2008. *Probability with R: An Introduction with Computer Science Applications.* Feldman and Valdez-Flores 2010. *Applied Probability and*

	Stochastic Processes. Jones et al. 2009. *Introduction to Scientific Programming and Simulation using R.* Braun and Murdoch 2008. *A First Course in Statistical Programming with R.* Kay 2005. *Intuitive Probability and Random Processes using MATLAB.*
課程相關 連結網址 Course Website	To be decided.
備註 Remarks	