



ISOM 1500 Insightful Decisions Fall 2016

Department of Information Systems, Business Statistics, and
Operations Management

COURSE:

ISOM 1500 Insightful Decisions (3-0-0:3)

The course helps students develop better analytical and decision making skills in approaching practical and important social and business issues. Students will derive solutions or conclusions that require critical thinking, creativity, quantitative analysis, and common sense. Cover topics in decision traps, quantitative decision models, statistical reasoning, computer tools, data-analysis techniques, etc. and, more importantly, how these decision analysis concepts and tools can be applied in a broad set of social and business problems.

L1: Room 5620 (Lift 31–32), 12:00–01:20 Tuesday

L2: Room 5620 (Lift 31–32), 09:00–10:20 Tuesday

L3: Room 5620 (Lift 31–32), 13:30–14:50 Tuesday

L4: Room 5620 (Lift 31–32), 16:30–17:50 Tuesday

INSTRUCTOR:

Prof. Ronald S. Lau (rlau@ust.hk)

Office: LSK-4081

Phone: 2358-8348

Office hours: 10:00–12:00 and 15:00–17:00 Monday or by appointment

**TEACHING
ASSISTANT:**

L1–L2: Carey Ma (imcma@ust.hk), L3–L4 Jing Jia (imjing@ust.hk)

Office: LSK-4065

Phone: 2358-8746

TEXTBOOK:

(Required)

Insightful Decisions (2013) by R.S.M. Lau, Publisher: Pearson

(For reference, library reserved items)

(1) The Flaw of Averages: Why We Underestimate Risk in the Face of Uncertainty (2009) by Sam L. Savage, Publisher: John Wiley & Sons

(2) Numbers Rule Your World: The Hidden Influence of Probabilities and Statistics on Everything You Do (2010) by Kaiser Fung, Publisher: McGraw Hill

**GRADING
POLICY:**

Final course grade will be determined by the following criteria and point distribution.

Online quizzes, discussions, and participation (in-class activities)	20
Group project and presentation	30
Final exam	<u>50</u>
Total	100

For online learning using the Canvas platform, you are required to complete the quizzes at the end of each learning module. Class attendance is expected as your participation points are primarily determined by in-class exercises and activities. You can earn additional participation points by making contribution in class discussions.

The combined score for online activities and in class participation that you can earn will be subject to a maximum of 2 points for each week (starting in week 3, Sunday to Saturday as defined in the university academic calendar). You can top up your score with online discussions (optional). Points will be awarded according to the relevance, quality, and pattern of your contribution and postings on the discussion board.

Class attendance is required. You should attend classes on time as any tardiness will affect the on-going in class activities. You will receive reduced participation points if you are up to 15 minutes late to class. No participation point will be given if you are late more than 15 minutes.

**COURSE
INTENDED
LEARNING
OUTCOMES:**

1. Apply the critical thinking process to solve problems, evaluate solutions, and to make actionable decisions.
2. Learn how to avoid and correct common decision errors that occur because of faulty assumptions or process.
3. Develop more confidence and appreciation using quantitative methodologies in the process of solving complicated problems.
4. Use computer spreadsheets effectively for analyzing data and presenting the conclusions.

**LEARNING
APPROACH:**

This course emphasizes on quantitative reasoning (instead of mindless, repetitive calculations). You will discover real, interesting applications and to apply the logic of reasonableness to process and interpret data for decision making. In the end, we expect you will recognize the usefulness of quantitative models in the decision making process and recognize the flaws and insights of such decisions.

This course will enhance your learning experience by adopting a new blended learning approach. Our goal of using a blended approach is to leverage the best aspects of both face-to-face and online learning for your benefit. Instead of using classroom time for presentation of materials that you can easily learn on your own, we will use the class time to engage you in more in-depth discussions and deepen your understanding of the topics through cases and games. You will further enhance your understanding in certain topics by completing a group project on real life, social issues, and high impact decisions.

Week	Online Learning Module	In-Class Learning Activities
Week 1 September 6	Introduction <ul style="list-style-type: none"> • Critical, analytical and statistical thinking in the decision making process 	Analytical thinking: “Just give me a number” Statistical thinking: The Monty Hall problem
Week 2 September 13	Decision analysis framework and environment <ul style="list-style-type: none"> • Developing the ability to think outside the box • Decision making under certainty, uncertainty, and risk 	Decision making models For discussion: Why do we make bad (or irrational) decisions?
Week 3 September 20	Decision traps <ul style="list-style-type: none"> • Reasons for flawed decisions and how to avoid them • The hidden traps in decision making and their examples 	Over-confidence trap: Estimation game For discussion: Space shuttle Challenger disaster
Week 4 September 27	Critical thinking <ul style="list-style-type: none"> • Development stages for a critical thinker • Logic, sound/valid arguments, and fallacies 	Mathematical logic: The number puzzle For discussion: Plane crash investigation
Week 5 October 4	Critical thinking (continued)	Moral hazard: The cash-in-a-hat game
Week 6 October 11	Analytical thinking <ul style="list-style-type: none"> • Quantitative models, heuristics, and simulation approaches 	Backward induction: The pirate game Prisoner dilemma: The golden ball
Week 7 October 18	Analytical thinking (continued) <ul style="list-style-type: none"> • Net present value and compound interest effect 	NPV analysis: Buy vs rent decision
Week 8 October 25	Analytical thinking (continued) <ul style="list-style-type: none"> • Multi-criteria decision making 	AHP: Choosing your next smartphone

<p>Week 9 November 1</p>	<p>Statistical thinking (chance-based)</p> <ul style="list-style-type: none"> • Wisdom of the crowds • Conditional probability 	<p>For discussion: Ramp metering and traffic flow</p> <p>Estimation: The M&M game</p>
<p>Week 10 November 8</p>	<p>Statistical thinking (correlation-based)</p> <ul style="list-style-type: none"> • Impact of outliers • Simpson paradox 	<p>For discussion: Correlation vs. causation</p>
<p>Week 11 November 15</p>	<p>Statistical thinking (fallacy-based)</p> <ul style="list-style-type: none"> • Hypothesis testing • Statistical errors 	<p>Statistical inference: The envelope game</p> <p>For discussion: Validity of medical tests</p>
<p>Week 12 November 22</p>	<p>Decision tree analysis</p> <ul style="list-style-type: none"> • Value of information and sensitivity analysis • Utility function 	<p>For discussion: The Pennzoil vs. Texaco case</p>
<p>Week 13 November 29</p>	<p>Technology enabled decision making</p>	<p>For discussion: Contemporary issues such as big data and artificial intelligence etc. and their impacts on decision making</p>

GROUP PROJECT

The instructor will assign you to a group to work on a topic that helps you deepen your understanding on any concepts covered in class, decision making process, or being an effective decision maker. Any relevant, interesting topic is acceptable. You can elaborate other concepts, including probability, coincidence, causation vs. association, and Sampson's paradox, etc. just to name a few. In addition, you can work on any other similar concepts or applications covered in class. All the topics and cases from the Fung's book and Savage's book are also considered relevant for the purpose of this assignment.

The completed project (including the video presentation, a written report, appendix, and any other reference materials) needs to be submitted by **December 4, 2016** to the Canvas platform. Late submission of your project will not be accepted.

The video presentation should last about 5-10 minutes. Your team is encouraged to use any graphic effects to enhance your presentation. To meet the very basic requirement, your team can simply voice over the presentation slides. Your classmates will be randomly selected to help evaluate your team's video presentation.

The written report (excluding the appendix) should be about 10 to 20 pages long, single spaced between lines but double spaced between paragraphs (like this document). You should supplement the materials from the instructor's published materials with the class notes, ideas from online discussion, other publications, or relevant information found on the Internet. Make sure you provide proper citations and bibliography of other external published work to avoid plagiarism.

The group project will account for 30 point of your course grade and its breakdown is as follows. The rubrics for scoring can be found at the end of this document.

- Video presentation (judged by 5 randomly selected peers): 10 points
- Video presentation (judged by instructors and TAs): 10 points
- Written report (judged by instructors): 10 points

The topic of your project is not limited by those covered in class. Other topics of interest may include the following examples:

- Association vs. causation: Is Fung Shui science or superstition? (critical thinking and statistical thinking)
- Chinese medicine (or other common medical beliefs or practices): For real or just a placebo effect? (critical thinking)
- Applying logic in critical thinking (critical thinking)
- Avoiding decision traps and fallacies (decision traps)
- Decision strategy in a "prisoner dilemma" situation (analytical thinking)
- Why do people believe in horoscope (or Bermuda's triangle and UFO, etc.)? (critical thinking)
- Fortune telling: A self-fulfilling prophecy? (critical thinking)
- Behavioral decision making issues (decision traps)
- Wrong conviction of Sally Clark (statistics thinking)
- How rare are coincidences? (statistical thinking)
- Is organic food (vitamin, beauty products etc.) worth buying? (critical thinking)
- Utility theory and risk attitude (statistical thinking)
- Six degree of separation (analytical thinking)
- Principal-agent problem in decision making (decision environment)
- The wisdom of the crowd (statistical thinking)
- Could Bayesian statistics help find the missing plane MH370? (statistical thinking)

APPENDIX 1 PEER EVALUATION

Evaluated by: _____

Evaluation criteria (max 20 points each criterion for a total of 100 points)

Criteria	Significantly below expectation (0-13 points)	Below expectation (14-15 points)	Meet expectation (16-17 points)	Exceed expectation (18-19 points)	Significantly exceed expectation (20 points)
Participation	Miss several team meetings without prior notice; do not participate effectively in team discussion of project issues	Miss one meeting without prior notice; or missed several team meetings with prior notice; participated in team discussions when asked	Miss no more than one team meeting with prior notice and proactively contribute to the team dialogue in most meetings	Attend all team meetings and often is a significant contributor to the team discussions	... plus are proactive in helping the team solve problems outside of meetings / assigned tasks, e.g., lead informal meetings to resolve team issues
Reliability	Work is usually incomplete and/ or late	Deliver most assigned work products on time and address assigned scope adequately in most cases	Deliver all assigned work products on time and consistently address assigned scope fully and appropriately	Consistently complete assignments early and/or often address additional scope beyond assigned	... and, in so doing, add value beyond assignment
Initiative and Sense of Responsibility	Wait until due date to bring up issues with assignment; are often not prepared for meetings	Reach out to other team members at last minute so there is not enough time to fix before due date; sometimes are not prepared for meetings	Verify scope of assigned work; when having difficulty with assigned work, is proactive to reach out to other team members with sufficient time to receive help; usually are prepared	Sought feedback on progress periodically throughout assignment to ensure that he/she was on target and is always prepared	Consistently take initiative to resolve issues through consultation with others, keeping everyone in the loop
Work quality	Work frequently contains mistakes, or is poorly communicated or without supporting backup evidence	Assign work is largely error free, but not always well communicated or with weak supporting rationale and backup	Assigned work is largely error free, clearly communicated verbally and graphically with adequate supporting backup materials	Work consistently error-free, well communicated verbally and graphically, with strong backup materials	... plus evidence of significant ingenuity or creativity or insight for the benefit of the team
Overall contribution to project success	Have almost no contribution	Have little contribution	Have some contribution	Have more contribution	Have significant contribution

Please evaluate each of the group members including yourself according to the five criteria as shown above. Your own performance evaluation is for reference only. Please refer to the rubrics for description. While using the individual rubrics are optional, you must enter the **total score** in the space below using the following ranges to reflect the overall performance: 96-100 (exceptional team player or leader); 90-95 (very good team player); 80-89 (good team player); 70-79 (acceptable team player); 69 or below (weak and not effective team player).

Name of Student	Participation	Reliability	Initiative	Work Quality	Contribution	Total Score

APPENDIX 2
EVALUATION FORM FOR THE GROUP PROJECT'S VIDEO PRESENTATION

Group: _____

Project title: _____

Evaluation criteria (max 20 points each criterion for a total of 100 points)

Subject matter: Interesting, relevant topic; well researched materials; clear purpose with a thoughtful conclusion	
Contents: Main points are well organized and developed; informative and accurate content; have a clear focus; clear introduction and conclusions; insightful and practical implications	
Visual effects: Visual aids / slides are creative; clear and easy to read and understand; enhance the effectiveness of the presentation; free of obvious misspellings or typos	
Presentation skills: Professional; comfortable and confident; good verbal and non-verbal (if appear in person) communication; flow and pace is consistently appropriate; good command of language; appropriate voice volume and tone	
Audience control: Enthusiastic; use the unexpected to full advantage; hold the audience's attention throughout; finish within the allotted time (15 minutes); overall quality of video effects	
Total: Use the following ranges to reflect the overall performance. 96-100 (exceptional presentation and extremely effective); 90-95 (very good presentation and very effective); 80-89 (good and effective); 70-79 (acceptable and somewhat effective); 69 or below (weak and not effective).	

Assessment rubric

	Exemplary	Above expectation	Meet expectation	Below expectation	Not acceptable
Points	19-20	17-18	15-16	13-14	0-12

APPENDIX 3

EVALUATION FORM FOR THE GROUP PROJECT'S WRITTEN REPORT

Group: _____

Project title: _____

Evaluation summary (max 10 points each criterion for a total of 100 points)

Choice of Topic	Relevance, importance and timeliness	
	Originality	
Use of Language	Grammar and punctuation	
	Spelling and choice of word	
Content	Organization, flow, clarity, and completeness	
	Professionalism and effective writing style	
	Mastery of the subject, insights and new discovery	
	Research and quality of information	
	Proper citations, references, and documentation	
Conclusion or implications	Significance and practicality	
Total: Use the following ranges to reflect the overall performance. 95-100 (exceptional report writing and extremely effective); 88-94 (very good report writing and very effective); 80-87 (good and effective); 70-79 (acceptable and somewhat effective); 69 or below (weak and not effective).		

Assessment rubric

	Exemplary	Above expectation	Meet expectation	Below expectation	Not acceptable
Points	10	9	7-8	5-6	0-4