

ISOM1500 (L1-L4) - Insightful Decisions

ISOM 1500 Insightful Decisions, Fall 2020

**Department of Information Systems, Business Statistics and
Operations Management**

COURSE: ISOM1500 Insightful Decisions (3-0-0:3)

This course will create a link between learning of the students and real life problems that can be solved using quantitative methods and decision models. By actively involving students to discover real, interesting applications and to apply logic and reason to process and interpret data for decision making, they will change their attitude toward quantitative models and recognize the flaws and insights of such decisions. The course can be further developed and improved as the student's collection of real life, social issues, and high impact decisions continues to grow through the completion of group projects. The course will be delivered in a blended learning format.

Most students, even with a limited background in math and statistics, should be able to handle them without much difficulty. We intend to cover many decision models and approaches without getting into any advanced and difficult computation. The structure of the course will also allow the students to learn from each other in class discussions and activities; i.e., we will create an opportunity for them to discover the right approaches to decision making through real life problems. Those topics, such as probability, heuristics, and sensitivity analysis, are only introduced as the basic decision-making tools.

Fall 2020

L1: Monday 10:30-11:50AM, Online via Zoom.

L2: Wednesday 9:00-10:20AM, Online via Zoom.

L3: Monday 9:00-10:20AM, Online via Zoom.

L4: Wednesday 10:30-11:50AM, Online via Zoom.

CILO: (1) Apply critical thinking frameworks and processes to examine social and business problems, evaluate potential solutions, and to develop actionable decisions; (2) Learn how to avoid and correct common decision errors that occur because of faulty assumptions or flawed decision processes; (3) Identify and apply quantitative methodologies to the process of solving complicated social and business problems; (4) Use computer spreadsheets effectively for analyzing data and presenting the conclusions.

INSTRUCTOR: Prof. Suri Gurumurthi (imsuri@ust.hk)

Office hours: Mondays, Wednesdays: 12-1pm

TEACHING ASSISTANTS Ms. Stacy Deng (imsdeng@ust.hk), Sections L2 and L3
Ms. Athena Chau (imachau@ust.hk) Section L1 and L4

REFERENCE TEXT: Online content in the form of Canvas Modules posted on canvas.ust.hk.

GRADING Final course grade will be determined by the following criteria and
POLICY: point distribution:

Class Participation	10 (5% to top-up)
Case Assignment	10
Midterm Exam (with slides)	30
Final Exam (with slides)	40
Online and In-Class Quizzes	15
Total	105 (5% to top-up)

Note: No makeup will be given for the midterm exam. If you miss the midterm exam for a valid reason approved by the instructor, a more comprehensive final exam will be weighted at 70% of the course grade instead. Your participation points are partly determined by in-class exercises/quizzes and other participation each week (total 10 points). **Excellent class discussion and questions raised or answered, will also contribute to the class participation grade. Your class participation grade includes 5% points to top-up your overall class performance.**

COURSE GRADE In determining the final course grade, your instructor will consider the **following targets**:

- A 90-100
- B 80-90
- C 70-80
- D 60-70
- F Below 60

ACADEMIC INTEGRITY: Students at HKUST are expected to observe the Academic Honor Code at all times (see [here Links to an external site.](#) for more information). Zero tolerance is shown to those who are caught cheating on the assignments or exam. Any act of cheating in this course will result in a XF grade for the course. This XF grade will stay with your record until graduation. If you receive another XF or X grade, you will be dismissed from the University.

BLENDED

LEARNING: This course will follow a blended learning format. Blended learning involves the use of classroom lectures, technology in the form of online Canvas tools, and out of class self-study to deliver effective and comprehensive learning. Practically what this means is that we will meet for an 80 minute lecture via Zoom only once per week per section. The time we have saved for the other lecture, will be used by students to absorb content delivered online via Canvas tools and to perform preparatory exercises in anticipation of the week's lecture. We will also use Canvas to complete assignments and to provide feedback on assignments. Blended learning, in my experience only works when we understand that there is greater emphasis on self-study and preparation prior to the lecture (and sometimes after the lecture also). **Recognizing this crucial point will lead to better performance throughout and at the end of the course.**

COURSE

MAP:

[Accessibility score: Low Click to improve](#)

Course Outline and Readings for Each Week

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Week 1

Sept 7

Conventional
Lecture

CILO 1,3

How We Make Decisions (Online asynchronous reading)

In-Class Activities: Discussion of common decisions we make every day versus common decisions we make that are significant and require analytical effort

Week 2

Sept 14

Conventional
Lecture

CILO 1,2

System 1 vs System 2 decisions;

1. “Thinking fast and slow” examples
2. Differences between System 1 and System 2
3. Classifying System 1 and System 2 decision-making

Week 3

Sept 21

½ Conventional
Lecture + ½ Flipped
Classroom

CILO 1,2

Common Elements of Effective Decision Processes

In-Class Activities:

1. Discuss the ProACT framework for decision-making
2. Discuss development of alternatives
3. Can good decision-making lead to negative outcomes?
4. Online survey to be completed in class.

Week 4

Different Problem Classes; Decision Fallacies & Common Errors

<p>Sept 28</p> <p>½ Conventional Lecture + ½ Flipped Classroom</p> <p>CILO 2,3</p>	<p>In-Class Activities:</p> <ol style="list-style-type: none"> 1. Define and identify different problem classes 2. Discuss common decision illusions; how people make the same decision error over and over; 3. How bad decisions can be learned from peers and becomes ingrained in society. 4. Online Canvas survey to be completed in class.
<p>Week 5</p> <p>Oct 5</p> <p>½ Conventional Lecture + ½ Flipped Classroom</p> <p>CILO 2,3</p>	<p>Critical Thinking Skills in System 1 and System 2</p> <p>In-Class Activities</p> <ol style="list-style-type: none"> 1. Discussion of Game Theory and Games 2. Critical thinking examples in interactive (or team) decision-making <p>Case Assignment Due</p>
<p>Week 6</p> <p>Oct 12</p> <p>½ Conventional Lecture + ½ Flipped Classroom</p> <p>CILO 2,3</p>	<p>Analytical Methods: Optimization</p> <p>In-Class Activities</p> <ol style="list-style-type: none"> 1. Thought Experiments involving Optimization 2. Spreadsheet Modeling and Excel Solver
<p>Week 7</p> <p>Week of Oct 19</p>	<p>Midterm Exam</p> <p>(Wednesday Oct 21st)</p> <p>No class meeting that week</p>
<p>Week 8</p> <p>Nov 2</p> <p>½ Conventional Lecture + ½ Flipped Classroom</p> <p>CILO 3,4</p>	<p>Decision-Making Under Uncertainty</p> <p>In-Class Activities</p> <ol style="list-style-type: none"> 1. Discussion of games of chance and concepts 2. How uncertainty can be a perception rather than reality 3. Discussion of basic constructs of decision making under risk

Week 9	Decision-Making Under Uncertainty
Nov 9	In-Class Activities
½ Conventional Lecture + ½ Flipped Classroom	<ol style="list-style-type: none"> 1. Making one-time decisions under uncertainty 2. Repeated decisions under uncertainty 3. Hedging and insurance decisions
CILO 2,3	
Week 10	Analytical Methods: Simulation Modeling
Nov 16	In-Class Activities
½ Conventional Lecture + ½ Flipped Classroom	<ol style="list-style-type: none"> 1. Discussion of examples of Random walks 2. Spreadsheet simulation model building
CILO 2,3	
Week 11	Analytical Methods: Decision Trees
Nov 23	In-Class Activities
½ Conventional Lecture + ½ Flipped Classroom	<ol style="list-style-type: none"> 1. Discussion of an Envelope Game 2. Multi-stage decision-making with recourse
CILO 3,4	
Week 12	Big Data and AI: Concepts and Challenges
Nov 30	In-Class Activities
½ Conventional Lecture + ½ Flipped Classroom	<ol style="list-style-type: none"> 1. Identify uses of big data 2. How can we make better decisions with Big Data? 3. Discuss examples of the use of AI/AR/VR 4. Will AI replace human decision-making?
CILO 1,2,3,4	