ISyE 4803 DMA Decision Modeling and Risk Analysis

Summer, 2026, ISyE Asia

MTWR 9:30 – 11:40, May 18 – June 24

Instructors: Kim Leng Poh, Chen Zhou

Prerequisite: ISYE 3232

Course Description

This course is a launchpad for data-driven decision-making and AI-era thinking - without heavy coding. Build a practical toolkit in decision analysis, probability (discrete and continuous), statistical sampling, regression for prediction and inference, and a unified optimization suite (linear, nonlinear, discrete, and multi-objective). Learn to turn messy real-world problems into clear models, quantify uncertainty and risk, and compute optimal (or near-optimal) policies. Emphasis is on interpretable, implementable methods and the foundations of AI decision workflows. Applications span engineering, business, healthcare, and finance. Coursework features case-based modeling in Excel; topics highlight Nobel-recognized methods and current ideas in machine learning and decision systems.

Course Learning Outcomes

At the end of this course, the students will be able to:

1. Articulate the data-driven decision-making process;
2. Build models to support decisions.
3. Analyze the decisions based on the data.
4. Model and analyze the risks.
5. Understand AI and its role in modern decision making.

Required Course Materials

Course Notes, to be available on Canvas.

Grading Policy

This course is graded on a letter grade basis. $A \geq 90, B \geq 80, C \geq 70, D \geq 60$. The weights of graded components are below. These cut-offs can be lower but not higher.

Category	Percentage %
Assignments (there are 2)	5%
Midterm	20%

Team project	25%
Final exam	50%

Description of Graded Components

Assignments: There will be 2 assignments, equally weighted at 2.5% each.

There will be a team project toward the end that is worth 25%.

Final: final is comprehensive and in person. Preparation materials will be provided.

USG required Course Policies

Attendance and/or Participation

You are encouraged to join the class during class if you are in a similar time zone and join the discussion.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Please review Georgia Tech's Honor Code, the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Core IMPACTS

Not applicable

Additional Georgia Tech Required Policies

Accommodation for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Collaborations, Group Work

You are allowed to work in groups on assignments, but any submission must be written in your own work. The assignments are for learning so that you can demonstrate your understanding on the test without these assistances. class tests and exams will be closed book and notes, but I will provide an equation sheet.

Use of Generative AI

Generative Artificial Intelligence (Gen AI, or AI) has changed how we learn and work in the human-in-the-loop decision or design process. You can use Chatbots to achieve better results and to develop your own intellectual capabilities. You can also take the path of minimum effort to achieve plausible result without learning. Your own contribution during your career will depend on your own capabilities in asking good questions, solid command of fundamentals, critical thinking of the AI generated results, logical thinking to link the fundamentals to the results, and the ability to judge your final submission. The discussion in human cognition, cognitive capacity, human behavior, human decision and intellectual development in this class will help you be more conscientious about how to use these tools to improve results and your intellectual development.

In this course, you can use any AI tools for learning. However, you must report

1. Which tool and how you used to tool on which problem in what way.
2. How the use of tools helped you to better understand the fundamentals, critical and logical thinking.