MECH 4000R – The Art and Science of Making Smart Engineering Decisions

School:	**School of Engineering**
Subject Area:	**Mechanical and Aerospace Engineering**
Course Credit:	**3**
Instructor:	**HO Vincent**
Pre-requisite/co-requisite:	**Nil**

Notes:

- The syllabi provided here is for reference only and may be subject to changes and adjustments as determined by the course instructors.

MECH4000R –The Art and Science of Making Smart Engineering Decisions

Summer 2024/25 (3-credits)

Course Instructor: Prof. Vincent HO

Class Quota: 60

Textbook: Nil

Course Description:
This summer course will explore the exciting world of decision-making in engineering design through a series of engaging and interactive classes. With a focus on practical applications, students will learn how to make risk-informed and cost-effective decisions in the engineering process, as well as in their careers. The course will feature light materials, hands-on activities, and real-world case studies to keep the learning experience fruitful and enjoyable.

Learning Objectives and Outcome:
This course is designed to equip students with essential decision-making skills for their future engineering careers. By the end of the course, students will be able to:
- Understand the importance of decision-making in engineering design
- Apply basic decision analysis techniques to engineering problems
- Understand the definitions of risk and its applications in engineering analyses
- Apply basic risk assessment tools and build logic models
- Balance decision-making processes with multiple criteria and decision-makers
- Demonstrate cost-effectiveness of engineering decisions
- Communicate decisions effectively through presentations and reports

Prerequisite (if applicable): Nil.

Grading Policy (Letter Grade)

Class Participation	30 marks
Examinations	30 marks
Case study/ assignments	40 marks
Total:	100 marks

Grade	Short description	Description
A+, A, A-	Excellent	Demonstrate evidence of critical thinking and proficiency in interpreting and applying engineering decision analysis principles and best practices, showcasing an excellent understanding of the intended subject learning outcomes.
B+, B, B-	Good	Demonstrate evidence of making well-founded judgments and critically analysing issues using engineering decision analysis techniques, illustrating a strong understanding of the intended subject learning outcomes.
C+, C, C-	Satisfactory	Demonstrate evidence of some capacity for analysis and judgment in engineering decision analysis, demonstrating a satisfactory understanding of the intended subject learning outcomes.

| D+ , D | Marginal Pass | Demonstrate evidence of achieving the intended subject learning outcomes marginally, being able to make basic comparisons, connections, and judgments regarding engineering decision analysis topics covered in the subject. |
| F | Fail | Demonstrate evidence of an inadequate achievement and understanding of the intended learning outcomes due to a lack of knowledge and understanding of the subject matter. The analysis provided is often irrelevant or incomplete. |

Course Schedule

Week	Topic
1	Basic decision-making theories and principles, decision analysis
2	Definition of risk, risk control strategies, logic trees, cost-benefit analysis
3	Making decisions and multiple attributes, multiple decision-makers
4	Risk communication, case studies