

SYLLABUS

QM403E

Decision Science

ACADEMIC AREA :	OPERATIONS AND ANALYTICS
PROGRAMME :	MASTER DAIS / PGE / UGTC LEVEL 4 PGE
PERIOD :	SPRING
COORDINATOR :	Mr. Muhammad HABIBI
INSTRUCTOR(S) :	Mr. Daniel SANCHEZ PINEDA Mr. Muhammad HABIBI
CONTACT HOURS :	24.0 hours
STUDY TIME :	null hours (Class preparation, homework and assessments)
CREDITS :	4.0 ECTS
AOL :	NO

PRE-REQUISITE MODULES :

None

MODULE DESCRIPTION :

The purpose of this module is to equip students with various methods covering Operations Research, Simulation and Behavioral Decision-Making

CONTRIBUTION TO PROGRAMME LEARNING OBJECTIVES :

- Integrate disciplines and deep knowledge to Create innovative solutions #CreateSolutions

MODULE INTENDED LEARNING OUTCOMES (ILOs) :

By the time students finish the course, they should be able to: 1. Comprehend the purpose of optimization, its importance, and its application, 2. Gain experience in using optimization software packages/library, 3. Be able to use computer simulation to model and simulate basic problems, 4. Attain basic understanding of behavioral decision-making and its application, and 5. Understand basics of Game Theory.

TOPICS COVERED :

Linear Programming Integer Programming Discrete-Event Simulation Behavioral Decision Game Theory

RESEARCH-LED TEACHING :

Some of the tutors' research projects on Optimization will be highlighted throughout the sessions

CSR AND SUSTAINABLE DEVELOPMENT GOALS :

0

CSR NB HOURS :

0

SUSTAINABLE DEVELOPMENT GOALS COVERED :

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TEACHING METHODS :

Lecture

Tutorial

METHODS OF ASSESSMENT :

Continuous/Final	Group/Individual	Assessment	Weight	Duration	ILOs assessed
Final	Individual	Final written exam	60%	3 Heures	All
Continuous	Group	Participation or task completion	40%		1,2, and 3

Assessment 1 details:

The exam covers all topics discussed

Assessment 2 details:

Group presentations on Linear Programming and Simulation.

ACADEMIC INTEGRITY :

Academic misconduct encompasses various behaviors or actions that violate the principles of academic integrity, fairness, and honesty, thereby undermining the credibility of academic work, assessments, or research. Examples of academic misconduct include:

- Cheating
- Plagiarism
- Fabrication
- Gaining an unfair advantage
- Assisting others in committing academic misconduct, such as by utilizing generative AI
- Falsification of records or official documents

- Unauthorized access to restricted information or data
- Unauthorized or unethical use of generative AIS

Academic misconduct is a serious offense and can result in consequences such as module failure, research project failure, or even expulsion from the school. To prevent unintentional academic misconduct, it is essential to consult with your instructor to understand the specific rules and instructions pertaining to the use of AI in learning and assessment.

For more comprehensive information on academic integrity rules, principles, and disciplinary procedures, please refer to the Academic Integrity section of the Student Handbook.

BIBLIOGRAPHY :

Taha H. A., (2017). Operations Research: An Introduction, Prentice Hall. (10th or later edn). Pearson Education. [eBook:<https://bit.ly/2XFHiFI>].

Hillier, F. ; Lieberman, G. J.; Jag, B. and Basu, P.. (2020). Introduction to Operations Research. (11th edn). McGraw Hill Higher Education. [eBook: <https://bit.ly/3vEr6lP>]

Additional Reading

Supplementary materials will be provided during the sessions.

MODULE PLAN SESSIONS :

Plan Session 01 :

Lecturer: M. K. HABIBI

Duration: 3 hours

Topics:

- Course Overview
- Burrito Optimization Game
- Linear Programming

Plan Session 02 :

Lecturer: M. K. HABIBI

Duration: 3 hours

Topics:

- Integer Programming

Plan Session 03 :

Lecturer: M. K. HABIBI

Duration: 3 hours

Topics:

- Big-M and Twophase Method

Plan Session 04 :

Lecturer: M. K. HABIBI

Duration: 3 hours

Topics:

- Python Implementation of Optimization

Plan Session 05 :

Lecturer: D. SANCHEZ-PENIDA

Duration: 3 hours

Topics:

- Simulation I

Plan Session 06 :

Lecturer: D. SANCHEZ-PENIDA

Duration: 3 hours

Topics:

- Simulation II

Plan Session 07 :

Lecturer: D. SANCHEZ-PENIDA

Duration: 3 hours

Topics:

- Behavioral Decision Making

Plan Session 08 :

Lecturer: D. SANCHEZ-PENIDA

Duration: 3 hours

Topics:

- Game Theory

- Continuous assessment on Linear Programming + Simulation

- Course's Wrap-Up and Student Feedback

