

IDENTIFICATION

Course code : DAT601
ECTS : 1

DURATION

Lectures : 4
Tutorial classes : 10
Labs : 6
Total : 20

Project :
Personnal work :

ASSESSMENT

Continuous assessments and practical evaluations.

TEACHING MATERIALS

All documents used during teaching sessions. If needed, additional references may be introduced.

LANGUAGE

English

CONTACT

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UE : UE6-DATA

COURSE : Artificial Intelligence and Operations Research

SCOPE OF THE COURSE

OBJECTIVES

This course aims to train students at the intersection of artificial intelligence (AI) and operations research (OR), with a particular focus on the diversity of problems that can be modeled using classical AI tools. A data scientist must be aware of the wide range of problems that can be addressed using formal logic methods, probabilistic methods, and exploratory methods. This course enables students to develop a deep understanding of fundamental principles and their application in various contexts.

COMPETENCE AND SKILLS

- Conduct exploratory data analysis
- Process massive datasets using data mining techniques
- Visualize data

PROGRAM

AI and formal logic :

- Predicate logic and examples of applications
- Automated reasoning : forward chaining, backward chaining
- Reasoning integrated into large-scale systems (e.g., Watson)

Probabilistic approaches

- Causal models
- Bayesian networks
- Markov Decision Processes (MDP)

Search and optimization strategies

- Representation of possible solutions to a problem in the state space
- Depth-first and breadth-first (i.e., uninformed) search of a state space
- Heuristic (i.e., informed) search of a state space (e.g., A* search)

BIBLIOGRAPHY

Russell, S. J., & Norvig, P. (2021). Artificial Intelligence : A Modern Approach, 4th US ed.

REQUIREMENTS

- Probability and random variables
- Stochastic processes
- DATA course (UE) from S5