

DTSC 8140 - Fundamentals of Artificial Intelligence

Foundations of AI techniques and their applications in various real-world domains and how to implement a system with intelligent functionality. Students will learn to judge when intelligent functionality and AI may be a good solution for a problem and be able to choose suitable AI methods and techniques.

Credit Hours: 3

Prerequisite(s): DTSC 8120

Student Learning Outcomes:

- (1) Getting familiar with variety of methods, tools, and techniques used to build intelligent systems
- (2) Getting familiar with mathematical foundations of AI, including different types of logics
- (3) Getting familiar with methods & tools which can be used to improve completeness and soundness of LLM
- (4) Learning how to design and build AI-based systems with an interactive interface and provide proper documentation

Course Materials (not required):

Artificial Intelligence, a Modern Approach
Stuart Russell, Peter Norvig
Prentice Hall Series in AI

List of topics:

Agents
Search Algorithms (Uniformed, Informed, Adversarial)
Logical Agents
Games and Puzzles
State Graphs vs Knowledge Graphs
Monte Carlo Method
Rough Sets vs Dempster-Shafer Theory
Propositional Logic
First-Order Logic
Godel's Completeness Theorem

Resolution
Gentzen Type of Systems
Modal Logic
Triangular Norms
Fuzzy Logic
Machine Learning, Deep Learning, & Reinforcement Learning
Folksonomy
Large Language Models (incompleteness & hallucinations)
Generative AI
Recommender Systems
Recommender Systems in Business, Healthcare, Art

Grading criteria and grading scale.

Midterm - 30 points, Final - 32 points, Project (maximum 2 students on the team) - 30 points, Attendance – 8 points

Grade A from 90 to 100 points, Grade B from 80 to 89 points, Grade C from 65 to 79 points.

Attendance Policy:

Attendance is mandatory (see grading policy below).

To be eligible to receive credits (1 point) for each attendance, you should not come in late or leave early for the class. Excuse absence must be accompanied by official documentation that clearly states that you were physically unable to make the class.

Course Link:

<https://webpages.charlotte.edu/ras/AI-Fall25.html>