

CS 504: Knowledge Representation and Reasoning

Fall 2022

Time and place: Wednesday 16:40–18:30 (FENS L056), Thursday 13:40–14:30 (FENS G025)

Instructor: Esra Erdem (esra.erdem@sabanciuniv.edu)

Office hour: By appointment (FENS G053)

Course description. This course is about representing knowledge symbolically and reasoning about it automatically. In particular, the mathematical foundations of various knowledge representation and reasoning formalisms (e.g., propositional and first-order logic, answer set programming, description logics, action languages, situation calculus), and their applications to computer sciences and other sciences (e.g., semantic web, planning, diagnosis, computational biology, biomedical informatics, natural language understanding, economics, robotics). We will study some of these topics by solving homework problems (both theoretical and application-oriented) and by discussing these solutions in class. We will also read and discuss related research papers.

Course objective. To prepare students to do research in logic-based artificial intelligence, and to solve computational problems declaratively.

Prerequisite. Some familiarity with logic will be helpful.

Textbook. There is no textbook; the necessary materials (e.g., homework problems, research papers) will be handed out in class or posted at SUCourse+.

Class participation. Students are expected to volunteer to present their own solutions to homework problems and problems listed in the lecture notes, and to participate in discussions about the solutions presented by others.

Homework. There will be three to four assignments.

Paper evaluations/presentations/discussions. Students are expected to read and evaluate the research papers studied in class, present one of them, and lead a discussion on the paper they present.

Project. Students are expected to work on a research problem and write a short report about their own solution.

Exams. There will be one exam. Students will be allowed to use the lecture notes and their notes, but no books.

Grading. Grades will be determined by class participation and homework (20%), paper evaluations/presentations/discussions (10%), exam (30%) and the project (40%).