האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

INTRODUCTION TO ARTIFICIAL INTELLIGENCE - 67842

Last update 19-04-2020

HU Credits: 5

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Computer Sciences

Academic year: 0

Semester: 2nd Semester

Teaching Languages: English

Campus: E. Safra

Course/Module Coordinator: Prof Jeff Rosenschein

Coordinator Email: jeff@cs.huji.ac.il

Coordinator Office Hours: Tuesdays, 10:30am-11:00am

Teaching Staff:

Prof Jeff Rosenschein
Mr. Yoni Sher
Mr. Reshef Mintz

Course/Module description:

The course serves as an introduction to the solution techniques and application areas in the field of artificial intelligence.

List of Topics:

1. Introduction to artificial intelligence

2. Search: uninformed, informed, constraint satisfaction problems, adversarial search

3. Knowledge representation: propositional and first-order logic, inference, unification, resolution

4. Planning: partial order planning, planning graphs, hierarchical task network planning

5. Basic probability: axioms of probability, independence, Bayes' Rule

6. Learning: learning from observations, learning decision trees, MDPs, reinforcement learning

7. Game theory: non-zero sum games, auctions, negotiation, voting, manipulation, power indexes

Course/Module aims:

To introduce students to the research field of Artificial Intelligence, with a particular emphasis on five basic areas within the field, namely: Search; Knowledge Representation; Planning; Learning; and Game Theory applied in multiagent systems.

Learning outcomes - On successful completion of this module, students should be able to:

See course aims

Attendance requirements(%):

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Teaching arrangement and method of instruction: Frontal lecture, plus exercise groups; students are given three small exams during the semester (on the five topic areas: search, knowledge representation, planning, learning, and game theory). Students also hand in four Python programming assignments, five regular assignments, and carry out a large-scaled project at the end of the semester.

Course/Module Content:

1. Introduction to artificial intelligence

2. Search: uninformed, informed, constraint satisfaction problems, adversarial search

3. Knowledge representation: propositional and first-order logic, inference, unification, resolution

4. Planning: STRIPS, SAS, PDDL, planning as SAT, planning as Search, relaxations, abstractions

5. Basic probability: axioms of probability, independence, Bayes' Rule

6. Learning: MDPs, reinforcement learning, learning from observations, learning decision trees

7. Game theory: non-zero sum games, auctions, negotiation, voting, manipulation, power indexes

Required Reading:

The primary textbook for the course is "Artificial Intelligence: A Modern Approach", by Stuart Russell and Peter Norvig, Third Edition, 2010.

Additional Reading Material:

Additional optional reading material is provided for each topic.

Course/Module evaluation:

End of year written/oral examination 0 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 40 %
Assignments 28 %
Reports 0 %

Research project 0 %
Quizzes 32 %
Other 0 %

Additional information:

The assignments, all together worth 28% of the final grade, are split into 4 Python programming assignments (worth 16% of the final grade) and five written assignments (worth 12% of the final grade).