COURSE LEARNING GOALS
The objective of the class is to:
(a) show how to identify the appropriate AI solutions for different classes of computational challenges and
(b) provide experience in implementing such solutions on representative challenges.
The course is intended for computer science graduate students, who have not been exposed to artificial intelligence material in the past. It can also appeal to students in related areas (such as psychology, mathematics, electrical, mechanical or biomedical engineering, etc.) who have interests in artificial intelligence methodologies and their applications.

Instructor
Abdeslam Boularias

Office
308 @ 1 Spring St, New Brunswick

Office hours
Mondays from 1:30pm to 3:30pm in Hill Center, office 277.

Teaching assistants
Aravind Sivaramakrishnan (as2578@scarletmail.rutgers.edu),
Yuting Wang (yw632@rutgers.edu),
Yikai Zhang (yz422@rutgers.edu),
Email address for contacting the TAs: cs440rutgers@gmail.com

Office Hours of the TAs
Aravind: Friday, 12-1pm. Hill 412.
Yuting: Wednesdays, 5-6pm. CBIM modular building.
Yikai: Wednesdays, 2-4pm. Hill 418.

ANONYMOUS SUGGESTION BOX
https://www.surveymonkey.com/r/WRXBM87

Topics
The class introduces fundamental ideas that have emerged over the past fifty years of AI research and provides a useful toolbox of AI algorithms. Example topics include:
(a) Deterministic Reasoning: Heuristic Search, Local Search, Adversarial Search, Constraint Satisfaction Problems
(b) Probabilistic Models: Bayesian Networks, Hidden Markov Models, Kalman and Particle Filters, (Partially Observable) Markov Decision Processes
(c) Machine Learning: Linear Models for Regression and Classification, Neural Networks, Kernel Methods, Gaussian Processes, Sparse Kernel Machines, Reinforcement Learning, Perception

BOOKS
Example textbooks include:
- "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig (Third Edition), Prentice Hall Series in Artificial Intelligence;
- "Pattern Recognition and Machine Learning" by Christopher Bishop, Springer

EXPECTED WORK
Regular readings and homeworks, some of which involve programming, and exams.

EXAMS
A midterm and a final examination. Typically the midterm exam covers the material on deterministic reasoning, as well bayesian networks and inference. The final exam also covers material on Markov Decision Processes and machine learning.

GRADING SCHEME
Midterm: 20%
Final Exam: 20%
Homework: 30%

Final Project: 30%

The mapping of scores to letter grades will be as follows:

- A: > 89
- B+: 80-89
- B: 70-79
- C+: 60-69
- C: 50-59
- D: 40-49
- F: less than 40

TENTATIVE SCHEDULE (SUBJECT TO CHANGES)
Lecture 1 : Introduction and Overview [Slides in PDF]
Lecture 2 : Uninformed Search [Slides in PDF]
Lecture 3 : Heuristic Search [Slides in PDF]
Lecture 4 : Local Search [Slides in PDF]
Lecture 5 : Adversarial Search [Slides in PDF]
Lecture 6 : Constraint Satisfaction Problems [Slides in PDF]
Midterm: November 4th, from 12:00pm to 1:20pm at ARC 103.
Lecture 7 : Probabilistic Reasoning [Slides in PDF]
Lecture 8 : Bayesian models [Slides in PDF]
Lecture 9 : Introduction to Machine Learning [Slides in PDF]
Lecture 10 : Temporal Models [Slides in PDF]
Lecture 11 : Markov Decision Processes [Slides in PDF]
Final : December 17th, from 9:00am to 11:00am at ARC 103.