## Course Title

**CAP 4630 Artificial Intelligence**

**Fall 2017**

## Catalog Description

Introduction to all major topics in artificial intelligence including search, logic, optimization, constraint satisfaction, planning, multiagent systems, machine learning. The class prepares students for advanced study and research in each of the individual topics and provides students with tools to apply the approaches to numerous industrial applications. The assignments involve a mix of theoretical and implementation exercises.

**3 Credits**

## Instructor

Samuel Ganzfried, 305-348-2034, sganzfri@cis.fiu.edu, School of Computing and Information Sciences, ECS 381.

Lectures: Tuesday Thursday 2-3:15, Green Library 139

Office hours: Tuesday 3:15-4:15pm

## Teaching assistant

Farzana Yusuf, fyusu003@fiu.edu, School of Computing and Information Sciences

Office hours: Thursday 3:15-4:15pm

## Prerequisites

One mathematical course beyond MAC2312 (Calculus 2), for example MAD 2104 (Discrete Math) or an equivalent course. Students should be familiar with mathematical proofs and with at least one standard programming language (e.g., Python, C, Java).

## Type

CAP 4630 is an advanced undergraduate course in computer science. Students from other departments are welcome.

**Website**

<http://www.ultimateaiclass.com/>

**Lecture videos**

<https://lecturecapture.fiu.edu/Mediasite/Catalog/catalogs/cap-4630-fall-2017>

## Announcements

https://moodle.cis.fiu.edu/

## Evaluation

Homeworks (4-5 total assignments), midterm exam, final exam, class project, each worth 25% of the final grade. Homeworks are due at 2pm at the start of class on the deadline or will be considered late. Students are allocated four total late days throughout the semester at no penalty. An additional late day will result in a 50% penalty, and then after the fifth late day no credit. Final letter grades will be determined based on a curve.

## Project

For the class project students will implement an agent for [3-player Kuhn poker](http://www.computerpokercompetition.org/index.php/75-limit-games).  This is a simple, yet interesting and nontrivial, variant of poker that has appeared in the AAAI Annual Computer Poker Competition. The grade will be partially based on performance against the other agents in a class-wide competition, as well as final reports and presentations describing the approaches used. Students can work alone or in groups of up to 3 people.

## Topics

1. Search
* uninformed search, informed search, local search, adversarial search, constraint satisfaction
1. Logic
* propositional logic, first-order logic, logical inference
1. Optimization
* integer optimization, linear optimization, nonlinear optimization
1. Planning
* classical planning, spatial planning
1. Probability
* Bayesian networks, hidden Markov models
1. Decision making
* Markov decision processes, multiagent systems, reinforcement learning
1. Machine learning
* classification, regression, clustering, deep learning

## Textbook(s)

1. Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig (required)
2. Operations Research Models and Methods by Paul Jensen and Jonathan Bard (optional)
3. Learn Python the Hard Way by Zed Shaw (optional)

## Miscellaneous

University drop date: 10/30

Attendance is encouraged but not mandatory. Lectures slides will be available the day after class. Lectures will be recorded as well.

Students can use laptops during class provided it is not disruptive to others.