St. Mary's College of Maryland

Department of Mathematics and Computer Science

COSC 480 – Advanced Techniques in Artificial Intelligence

Fall 2014 Syllabus

Meeting Time: TR 10:00-11:50 am

Room: Schaefer 160

Instructor: Abdel Salam Sayyad

Office: Schaefer 152

Office Hours: MTWR 12:30-1:50 pm

Email: asayyad@smcm.edu

Textbook: Luke, Sean. Essentials of Metaheuristics. Second Edition. Available online at
http://cs.gmu.edu/~sean/book/metaheuristics/

Primary Website: https://blackboard.smcm.edu

Secondary Website: http://faculty.smcm.edu/asayyad/cosc480.htm

Catalog Description

This course covers Metaheuristic Search Algorithms, Artificial Neural Networks, and Bayesian Belief
Networks. Students will work on projects related to machine learning and optimization. Prerequisite is
COSC 201 or permission of instructor.

Overview

Metaheuristics are stochastic optimization algorithms intended to be the last resort before giving up and
using random or brute-force search. Such algorithms are used for problems where you don't know how
to find a good solution, but if shown a candidate solution, you can give it a grade. The algorithmic family
includes genetic algorithms, hill-climbing, simulated annealing, ant colony optimization, and particle
swarm optimization. Also covered in the course are two machine learning techniques, namely Artificial
Neural Networks (ANNs) and Bayesian Belief Networks (BBNs). The course will emphasize the practical
and experimentation aspect rather than the mathematical derivations.

Tool

The projects in this course will be based on the jMetal framework, available from
http://jmetal.sourceforge.net/

Download it, create an Eclipse project for it, and read the manual!

Grade Distribution

Individual Assignments – 20%

Midterm Exam (Thursday 10/30/2014) – 20%

Project report – 30%

Project poster – 15%

Project oral presentation – 15%

No Final Exam

Policies

Cell Phones: Please, turn off or turn to silent any cell phones prior to getting to class. If they go off in class they are distraction not only to myself, but to everyone else in the class as well. Habitual offenders will be excused from the class with a 0 for any assessments that day.

Computer Use: Computer use in this lab is for academic use only. If you bring a laptop with you to this class I expect you to be only using it for purposes related to this class. The same goes for the desktops in the lab.

Academic Honesty

Academic misconduct policies are covered in the Student Code and Student Rights and Responsibilities, Article III. Pay close attention to the definitions of academic misconduct noted in Section 1. This can be found in the Student Handbook.

Disability

If you have any kind of disability that requires any special accommodation in this class, please let me know privately through email or stopping by my office.

Tentative schedule

Please check the class website http://faculty.smcm.edu/asayyad/cosc480.htm for a detailed and up-to-date schedule.

Week	Topic(s)
1	Syllabus and introduction Single-state search methods
2	Population search methods
3	Representation
4	Parallel methods and co-evolution
5	Multi-Objective Optimization
6	Project discussions
7	Project discussions
8	Introduction to Machine Learning methods
9	Review **10/30 Midterm Exam**
10	Artificial Neural Networks (ANNs)
11	More ANNs
12	Bayesian Belief Networks (BBNs)
13	More BBNs
14	Project oral presentations
15	Project oral presentations
16	**Wed 12/17 Final Exam time (9:00am – 11:15am) may be used for project oral presentations**