Module Overview

Yuhui Shi

CSE, SUSTech

Instructors

- Instructor: Prof. Yuhui Shi (shiyh@sustech.edu.cn)

- Credits: 3

- Hours: 64

- Languages: Chinese, English

- Teaching assistant:
  - ✓Ms. Honglin Jin (12531321@mail.sustech.edu.cn)

Course Description

- Outline:
  - ✓ This course introduces the main concepts, algorithms, techniques and applications of evolutionary computation (EC). It covers single/multi-/many objective evolutionary optimisation, constrained optimisation, evolutionary learning, co-evolution, and applications of evolutionary algorithms.

- Teaching Methods:
  - ✓ 100 mins lecture + 100 mins lab every teaching week.

Learning Outcomes

- Upon finishing this course, students are expected to:
  - ✓understand most important evolutionary algorithms (EAs) presented in the course;
  - ✓be able to implement different EAs;
  - ✓be able to determine the appropriate parameter settings to make different EAs work well;
  - ✓be able to design with justification new evolutionary operators, representations and fitness functions for different applications;
  - ✓understand the strength and weakness of evolutionary computation in relation to other competing approaches and algorithms.

Important Notes

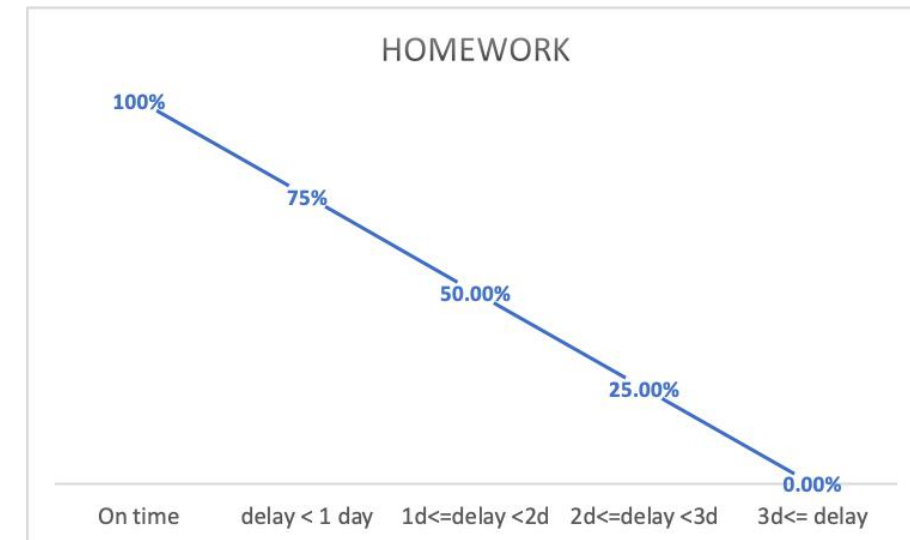Learning to learn is absolutely essential.

1. The pre-requisite of this course (CSE5012) is CS303: Artificial Intelligence.
2. We assume the students of this course have a background in computer science or computer engineering. Basic knowledge of programming, data structures and algorithms are assumed. If your first degree is not in CS/CE, you should not take this course.
3. For every lecture hour, we expect a student with a computer science background to spend 2-3 hours outside the lecture to fully digest the content. Otherwise, we do not believe a student will be able to achieve over 60% marks.
4. We require students to read relevant materials before each lecture, in order to increase the efficiency of lecture room learning.
5. If you do not attend a lecture, we will assume that you know all the contents of that lecture and information given at the lecture. We will not repeat any content and information about that lecture to you outside the lecture.

Professional Behaviours

- Be polite and cooperative to others.
- Respect each other.
- Follow rules and regulations. There will be no exceptions.
- Plagiarism or unethical behaviours will be punished.
    - ✓Zero tolerance. If a student is found to have an academic misconduct, e.g., plagiarism, no matter how minor it is and even it is his/her first time, his/her mark for the entire course will be zero.
    - ✓This is stricter than the departmental rules. If you do not want to follow this strict rule, you should not take this course.
- It's OK to work in teams. It's actually encouraged. However, if you have used code or materials that are not yours, please acknowledge them.
- Do not play mobile phone or talk to each other during classes.

Course Assessment

- Three assignments (60%): Homework + presentations

- Approximately every 4 weeks an assignment will be given.

- An assignment is composed of a homework (programming work) and presentations (including a written report and/or an oral presentation during class/lab time).

- Late submission will be penalised (25% for each day late)

- Close-book mid-term test (20%)

- Close-book final exam (20%)

HOMEWORK

100%
75%
50.00%
25.00%
0.00%

On time   delay < 1 day   1d<=delay <2d   2d<=delay <3d   3d<= delay

Recommended Literature for This Course

- Books:
  - ✓ T. Baeck, D. B. Fogel, and Z. Michalewicz (eds.). Handbook of Evolutionary Computation, IOP Publ. Co. & Oxford University Press, 1997.
  - ✓ Z. Michalewicz. Genetic Algorithms + Data Structures = Evolution Programs (3rd edition), Springer-Verlag, Berlin, 1996
  - ✓ A. E. Eiben & J. E. Smith (2003). Introduction to Evolutionary Computing. Berlin: springer. (Second Edition)
  - ✓ W. Banzhaf, P. Nordin, R. E. Keller & F. D. Francone. Genetic Programming: An Introduction. Morgan Kaufmann, 1999.

- Reading materials: Relevant papers/books as given at each lecture.